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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C12N 15/11, 9/00, 5/10 — A2

(11) International Publication Number: **WO 97/15662**

(43) International Publication Date: 1 May 1997 (01.05.97)

(21) International Application Number: PCT/US96/17480

(22) International Filing Date: 25 October 1996 (25.10.96)

(30) Priority Data:

60/005,974	26 October 1995 (26.10.95)	US
08/584,040	11 January 1996 (11.01.96)	US

(81) Designated States: AU, CA, JP, MX, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
Without international search report and to be republished upon receipt of that report.

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(54) Title: METHOD AND REAGENT FOR THE TREATMENT OF DISEASES OR CONDITIONS RELATED TO LEVELS OF VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR

(57) Abstract

Nucleic acid molecule which modulates the synthesis, expression and/or stability of an mRNA encoding one or more receptors of vascular endothelial growth factor.

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DESCRIPTION

Method and Reagent for the Treatment of Diseases or Conditions Related to Levels of Vascular Endothelial Growth Factor Receptor

Background Of The Invention

This application is a continuation-in-part of Pavco et al., U.S. Serial No. 60/005,974 all of which is hereby incorporated by reference herein (including drawings).

This invention relates to methods and reagents for the treatment of diseases or conditions relating to the levels of expression of vascular endothelial growth factor (VEGF) receptor(s).

The following is a discussion of relevant art, none of which is admitted to be prior art to the present invention.

VEGF, also referred to as vascular permeability factor (VPF) and vasculotropin, is a potent and highly specific mitogen of vascular endothelial cells (for a review see Ferrara, 1993 *Trends Cardiovas. Med.* 3, 244; Neufeld *et al.*, 1994 *Prog. Growth Factor Res.* 5, 89). VEGF induced neovascularization is implicated in various pathological conditions such as tumor angiogenesis, proliferative diabetic retinopathy, hypoxia-induced angiogenesis, rheumatoid arthritis, psoriasis, wound healing and others.

VEGF, an endothelial cell-specific mitogen, is a 34-45 kDa glycoprotein with a wide range of activities that include promotion of angiogenesis, enhancement of vascular-permeability and others. VEGF belongs to the platelet-derived growth factor (PDGF) family of growth factors with approximately 18% homology with the A and B chain of PDGF at the amino acid level. Additionally, VEGF contains the eight conserved cysteine residues common to all growth factors belonging to the PDGF family (Neufeld *et al.*, *supra*). VEGF protein is believed to exist

predominantly as disulfide-linked homodimers; monomers of VEGF have been shown to be inactive (Plouet *et al.*, 1989 *EMBO J.* 8, 3801).

VEGF exerts its influence on vascular endothelial cells by binding to specific high-affinity cell surface receptors. Covalent cross-linking experiments with ^{125}I-labeled VEGF protein have led to the identification of three high molecular weight complexes of 225, 195 and 175 kDa presumed to be VEGF and VEGF receptor complexes (Vaisman *et al.*, 1990 *J. Biol. Chem.* 265, 19461). Based on these studies VEGF-specific receptors of 180, 150 and 130 kDa molecular mass were predicted. In endothelial cells, receptors of 150 and the 130 kDa have been identified. The VEGF receptors belong to the superfamily of receptor tyrosine kinases (RTKs) characterized by a conserved cytoplasmic catalytic kinase domain and a hydrophylic kinase sequence. The extracellular domains of the VEGF receptors consist of seven immunoglobulin-like domains that are thought to be involved in VEGF binding functions.

The two most abundant and high-affinity receptors of VEGF are flt-1 (*fms*-like tyrosine kinase) cloned by Shibuya *et al.*, 1990 *Oncogene* 5, 519 and KDR (kinase-insert-domain-containing receptor) cloned by Terman *et al.*, 1991 *Oncogene* 6, 1677. The murine homolog of KDR, cloned by Mathews *et al.*, 1991, *Proc. Natl. Acad. Sci.*, USA, 88, 9026, shares 85% amino acid homology with KDR and is termed as flk-1 (fetal liver kinase-1). Recently it has been shown that the high-affinity binding of VEGF to its receptors is modulated by cell surface-associated heparin and heparin-like molecules (Gitay-Goren *et al.*, 1992 *J. Biol. Chem.* 267, 6093).

VEGF expression has been associated with several pathological states such as tumor angiogenesis, several forms of blindness, rheumatoid arthritis, psoriasis and others. Following is a brief summary of evidence supporting the involvement of VEGF in various diseases:

1) Tumor angiogenesis: Increased levels of VEGF gene expression have been reported in vascularized and edema-associated brain tumors (Berkman *et al.*, 1993 *J. Clini. Invest.* 91, 153). A more direct demostration of the role of VEGF in tumor angiogenesis was demonstrated by Jim Kim *et al.*, 1993 *Nature* 362,841 wherein, monoclonal antibodies against VEGF were successfully used to inhibit the growth of rhabdomyosarcoma, glioblastoma multiforme cells in nude mice. Similarly, expression of a dominant negative mutated form of the flt-1 VEGF receptor inhibits vascularization induced by human glioblastoma cells in nude mice (Millauer *et al.*, 1994, *Nature* 367, 576).

2) Ocular diseses: Aiello *et al.*, 1994 *New Engl. J. Med.* 331, 1480, showed that the ocular fluid, of a majority of patients suffering from diabetic retinopathy and other retinal disorders, contains a high concentration of VEGF. Miller *et al.*, 1994 *Am. J. Pathol.* 145, 574, reported elevated levels of VEGF mRNA in patients suffering from retinal ischemia. These observations support a direct role for VEGF in ocular diseases.

3) Psoriasis: Detmar *et al.*, 1994 *J. Exp. Med.* 180, 1141 reported that VEGF and its receptors were over-expressed in psoriatic skin and psoriatic dermal microvessels, suggesting that VEGF plays a significant role in psoriasis.

4) Rheumatoid arthritis: Immunohistochemistry and *in situ* hybridization studies on tissues from the joints of patients suffering from rheumatoid arthritis show an increased level of VEGF and its receptors (Fava *et al.*, 1994 *J. Exp. Med.* 180, 341). Additionally, Koch *et al.*, 1994 *J. Immunol.* 152, 4149, found that VEGF-specific antibodies were able to significantly reduce the mitogenic activity of synovial tissues from patients suffering from rheumatoid arthritis. These observations support a direct role for VEGF in rheumatoid arthritis.

In addition to the above data on pathological conditions involving excessive angiogenesis, a number of

studies have demonstrated that VEGF is both necessary and sufficient for neovascularization. Takashita *et al.*, 1995 *J. Clin. Invest.* 93, 662, demonstrated that a single injection of VEGF augmented collateral vessel development in a rabbit model of ischemia. VEGF also can induce neovascularization when injected into the cornea. Expression of the VEGF gene in CHO cells is sufficient to confer tumorigenic potential to the cells. Kim *et al.*, *supra* and Millauer *et al.*, *supra* used monoclonal antibodies against VEGF or a dominant negative form of flk-1 receptor to inhibit tumor-induced neovascularization.

During development, VEGF and its receptors are associated with regions of new vascular growth (Millauer *et al.*, 1993 *Cell* 72, 835; Shalaby *et al.*, 1993 *J. Clin. Invest.* 91, 2235). Furthermore, transgenic mice lacking either of the VEGF receptors are defective in blood vessel formation, infact these mouse do not survive; flk-1 appears to be required for differentiation of endothelial cells, while flt-1 appears to be required at later stages of vessel formation (Shalaby *et al.*, 1995 *Nature* 376, 62; Fung *et al.*, 1995 *Nature* 376, 66). Thus, these receptors must be present to properly signal endothelial cells or their precursors to respond to vascularization-promoting stimuli.

All of the conditions listed above, involve extensive vascularization. This hyper-stimulation of endothelial cells may be alleviated by VEGF antagonists. Thus most of the therapeutic efforts for the above conditions have concentrated on finding inhibitors of the VEGF protein.

Kim *et al.*, 1993 *Nature* 362, 841 have been successful in inhibiting VEGF-induced tumor growth and angiogenesis in nude mice by treating the mice with VEGF-specific monoclonal antibody.

Koch *et al.*, 1994 *J. Immunol.* 152, 4149 showed that the mitogenic activity of microvascular endothelial cells found in rheumatoid arthritis (RA) synovial tissue explants and the chemotactic property of endothelial cells

from RA synovial fluid can be neutralized significantly by treatment with VEGF-specific antibodies.

Ullrich *et al.*, International PCT Publication No. WO 94/11499 and Millauer *et al.*, 1994 *Nature* 367, 576 used a soluble form of flk-1 receptor (dominant-negative mutant) to prevent VEGF-mediated tumor angiogenesis in immunodeficient mice.

Kendall and Thomas, International PCT Publication No. WO 94/21679 describe the use of naturally occuring or recombinantly-engineered soluble forms of VEGF receptors to inhibit VEGF activity.

Robinson, International PCT Publication No. WO 95/04142 describes the use of antisense oligonucleotides targeted against VEGF RNA to inhibit VEGF expression.

Jellinek *et al.*, 1994 *Biochemistry* 33, 10450 describe the use of VEGF-specific high-affinity RNA aptamers to inhibit the binding of VEGF to its receptors.

Rockwell and Goldstein, International PCT Publication No. WO 95/21868, describe the use of anti-VEGF receptor monoclonal antibodies to neutralize the the effect of VEGF on endothelial cells.

Summary Of The Invention

The invention features novel nucleic acid-based techniques [e.g., enzymatic nucleic acid molecules (ribozymes), antisense nucleic acids, 2-5A antisense chimeras, triplex DNA, antisense nucleic acids containing RNA cleaving chemical groups (Cook *et al.*, U.S. Patent 5,359,051)] and methods for their use to down regulate or inhibit the expression of receptors of VEGF (VEGF-R).

In a preferred embodiment, the invention features use of one or more of the nucleic acid-based techniques to inhibit the expression of flt-1 and/or flk-1/KDR receptors.

By "inhibit" it is meant that the activity of VEGF-R or level of mRNAs or equivalent RNAs encoding VEGF-R is reduced below that observed in the absence of the nucleic acid. In one embodiment, inhibition with ribozymes

preferably is below that level observed in the presence of an enzymatically inactive RNA molecule that is able to bind to the same site on the mRNA, but is unable to cleave that RNA. In another embodiment, inhibition with antisense oligonucleotides is preferably below that level observed in the presence of for example, an oligonucleotide with scrambled sequence or with mismatches.

By "enzymatic nucleic acid molecule" it is meant an RNA molecule which has complementarity in a substrate binding region to a specified gene target, and also has an enzymatic activity which is active to specifically cleave target RNA. That is, the enzymatic RNA molecule is able to intermolecularly cleave RNA and thereby inactivate a target RNA molecule. This complementary regions allow sufficient hybridization of the enzymatic RNA molecule to the target RNA and thus permit cleavage. One hundred percent complementarity is preferred, but complementarity as low as 50-75% may also be useful in this invention. By "equivalent" RNA to VEGF-R is meant to include those naturally occurring RNA molecules in various animals, including human, mice, rats, rabbits, primates and pigs.

By "antisense nucleic acid" it is meant a non-enzymatic nucleic acid molecule that binds to target RNA by means of RNA-RNA or RNA-DNA or RNA-PNA (protein nucleic acid; Egholm *et al.*, 1993 *Nature* 365, 566) interactions and alters the activity of the target RNA (for a review see Stein and Cheng, 1993 *Science* 261, 1004).

By "2-5A antisense chimera" it is meant, an antisense oligonucleotide containing a 5' phosphorylated 2'-5'-linked adenylate residues. These chimeras bind to target RNA in a sequence-specific manner and activate a cellular 2-5A-dependent ribonuclease which, in turn, cleaves the target RNA (Torrence *et al.*, 1993 *Proc. Natl. Acad. Sci. USA* 90, 1300).

By "triplex DNA" it is meant an oligonucleotide that can bind to a double-stranded DNA in a sequence-specific manner to form a triple-strand helix. Formation of such

triple helix structure has been shown to inhibit transcription of the targeted gene (Duval-Valentin *et al.*, 1992 *Proc. Natl. Acad. Sci.USA* 89, 504).

By "gene" it is meant a nucleic acid that encodes an RNA.

By "complementarity" it is meant a nucleic acid that can form hydrogen bond(s) with other RNA sequence by either traditional Watson-Crick or other non-traditional types (for example, Hoogsteen type) of base-paired interactions.

Six basic varieties of naturally-occurring enzymatic RNAs are known presently. Each can catalyze the hydrolysis of RNA phosphodiester bonds in *trans* (and thus can cleave other RNA molecules) under physiological conditions. Table I summarizes some of the characteristics of these ribozymes. In general, enzymatic nucleic acids act by first binding to a target RNA. Such binding occurs through the target binding portion of a enzymatic nucleic acid which is held in close proximity to an enzymatic portion of the molecule that acts to cleave the target RNA. Thus, the enzymatic nucleic acid first recognizes and then binds a target RNA through complementary base-pairing, and once bound to the correct site, acts enzymatically to cut the target RNA. Strategic cleavage of such a target RNA will destroy its ability to direct synthesis of an encoded protein. After an enzymatic nucleic acid has bound and cleaved its RNA target, it is released from that RNA to search for another target and can repeatedly bind and cleave new targets. Thus, a single ribozyme molecule is able to cleave many molecules of target RNA. In addition, the ribozyme is a highly specific inhibitor of gene expression, with the specificity of inhibition depending not only on the base-pairing mechanism of binding to the target RNA, but also on the mechanism of target RNA cleavage. Single mismatches, or base-substitutions, near the site of cleavage can completely eliminate catalytic activity of a ribozyme.

Ribozymes that cleave the specified sites in VEGF-R mRNAs represent a novel therapeutic approach to treat tumor angiogenesis, ocular diseases, rhuematoid arthritis, psoriasis and others. Applicant indicates that ribozymes are able to inhibit the activity of VEGF-R (specifically flt-1 and flk-1/KDR) and that the catalytic activity of the ribozymes is required for their inhibitory effect. Those of ordinary skill in the art will find that it is clear from the examples described that other ribozymes that cleave VEGF-R mRNAs may be readily designed and are within the invention.

In preferred embodiments of this invention, the enzymatic nucleic acid molecule is formed in a hammerhead or hairpin motif, but may also be formed in the motif of a hepatitis delta virus, group I intron or RNaseP RNA (in association with an RNA guide sequence) or *Neurospora* VS RNA. Examples of such hammerhead motifs are described by Rossi *et al.*, 1992, *AIDS Research and Human Retroviruses* 8, 183, of hairpin motifs by Hampel *et al.*, EP0360257, Hampel and Tritz, 1989 *Biochemistry* 28, 4929, and Hampel *et al.*, 1990 *Nucleic Acids Res.* 18, 299, and an example of the hepatitis delta virus motif is described by Perrotta and Been, 1992 *Biochemistry* 31, 16; of the RNaseP motif by Guerrier-Takada *et al.*, 1983 *Cell* 35, 849, *Neurospora* VS RNA ribozyme motif is described by Collins (Saville and Collins, 1990 *Cell* 61, 685-696; Saville and Collins, 1991 *Proc. Natl. Acad. Sci. USA* 88, 8826-8830; Collins and Olive, 1993 *Biochemistry* 32, 2795-2799) and of the Group I intron by Cech *et al.*, U.S. Patent 4,987,071. These specific motifs are not limiting in the invention and those skilled in the art will recognize that all that is important in an enzymatic nucleic acid molecule of this invention is that it has a specific substrate binding site which is complementary to one or more of the target gene RNA regions, and that it have nucleotide sequences within or surrounding that substrate binding site which impart an RNA cleaving activity to the molecule.

In a preferred embodiment the invention provides a method for producing a class of enzymatic cleaving agents which exhibit a high degree of specificity for the RNA of a desired target. The enzymatic nucleic acid molecule is preferably targeted to a highly conserved sequence region of target mRNAs encoding VEGF-R proteins (specifically flt-1 and flk-1/KDR) such that specific treatment of a disease or condition can be provided with either one or several enzymatic nucleic acids. Such enzymatic nucleic acid molecules can be delivered exogenously to specific tissue or cellular targets as required. Alternatively, the ribozymes can be expressed from DNA and/or RNA vectors that are delivered to specific cells.

Synthesis of nucleic acids greater than 100 nucleotides in length is difficult using automated methods, and the therapeutic cost of such molecules is prohibitive. In this invention, small nucleic acid motifs (*e.g.*, antisense oligonucleotides, hammerhead or the hairpin ribozymes) are used for exogenous delivery. The simple structure of these molecules increases the ability of the nucleic acid to invade targeted regions of the mRNA structure. However, these nucleic acid molecules can also be expressed within cells from eukaryotic promoters (*e.g.*, Izant and Weintraub, 1985 *Science* 229, 345; McGarry and Lindquist, 1986 *Proc. Natl. Acad. Sci.* USA 83, 399; Sullenger-Scanlon *et al.*, 1991, *Proc. Natl. Acad. Sci. USA*, 88, 10591-5; Kashani-Sabet *et al.*, 1992 *Antisense Res. Dev.*, 2, 3-15; Dropulic *et al.*, 1992 *J. Virol*, 66, 1432-41; Weerasinghe *et al.*, 1991 *J. Virol*, 65, 5531-4; Ojwang *et al.*, 1992 *Proc. Natl. Acad. Sci. USA* 89, 10802-6; Chen *et al.*, 1992 *Nucleic Acids Res.*, 20, 4581-9; Sarver *et al.*, 1990 *Science* 247, 1222-1225; Thompson *et al.*, 1995 *Nucleic Acids Res.* 23, 2259). Those skilled in the art realize that any nucleic acid can be expressed in eukaryotic cells from the appropriate DNA/RNA vector. The activity of such nucleic acids can be augmented by their release from the primary transcript by a ribozyme (Draper

et al., PCT WO93/23569, and Sullivan *et al.*, PCT WO94/02595, both hereby incorporated in their totality by reference herein; Ohkawa *et al.*, 1992 Nucleic Acids Symp. Ser., 27, 15-6; Taira *et al.*, 1991, Nucleic Acids Res., 19, 5125-30; Ventura *et al.*, 1993 Nucleic Acids Res., 21, 3249-55; Chowrira *et al.*, 1994 J. Biol. Chem. 269, 25856).

Such nucleic acids are useful for the prevention of the diseases and conditions discussed above, and any other diseases or conditions that are related to the levels of VEGF-R (specifically flt-1 and flk-1/KDR) in a cell or tissue.

By "related" is meant that the reduction of VEGF-R (specifically flt-1 and flk-1/KDR) RNA levels and thus reduction in the level of the respective protein will relieve, to some extent, the symptoms of the disease or condition.

Ribozymes are added directly, or can be complexed with cationic lipids, packaged within liposomes, or otherwise delivered to target cells or tissues. The nucleic acid or nucleic acid complexes can be locally administered to relevant tissues ex vivo, or in vivo through injection, infusion pump or stent, with or without their incorporation in biopolymers. In preferred embodiments, the ribozymes have binding arms which are complementary to the sequences in Tables II to IX. Examples of such ribozymes also are shown in Tables II to IX. Examples of such ribozymes consist essentially of sequences defined in these Tables. By "consists essentially of" is meant that the active ribozyme contains an enzymatic center equivalent to those in the examples, and binding arms able to bind mRNA such that cleavage at the target site occurs. Other sequences may be present which do not interfere with such cleavage.

In another aspect of the invention, ribozymes that cleave target RNA molecules and inhibit VEGF-R (specifically flt-1 and flk-1/KDR) activity are expressed from transcription units inserted into DNA or RNA vectors. The

recombinant vectors are preferably DNA plasmids or viral vectors. Ribozyme expressing viral vectors could be constructed based on, but not limited to, adeno-associated virus, retrovirus, adenovirus, or alphavirus. Preferably, the recombinant vectors capable of expressing the ribozymes are delivered as described above, and persist in target cells. Alternatively, viral vectors may be used that provide for transient expression of ribozymes. Such vectors might be repeatedly administered as necessary. Once expressed, the ribozymes cleave the target mRNA. Delivery of ribozyme expressing vectors could be systemic, such as by intravenous or intramuscular administration, by administration to target cells ex-planted from the patient followed by reintroduction into the patient, or by any other means that would allow for introduction into the desired target cell.

By "vectors" is meant any nucleic acid- and/or viral-based technique used to deliver a desired nucleic acid.

Other features and advantages of the invention will be apparent from the following description of the preferred embodiments thereof, and from the claims.

Description Of The Preferred Embodiments

First the drawings will be described briefly.

Drawings

Figure 1 is a diagrammatic representation of the hammerhead ribozyme domain known in the art. Stem II can be ≥ 2 base-pair long.

Figure 2a is a diagrammatic representation of the hammerhead ribozyme domain known in the art; Figure 2b is a diagrammatic representation of the hammerhead ribozyme as divided by Uhlenbeck (1987, *Nature*, 327, 596-600) into a substrate and enzyme portion; Figure 2c is a similar diagram showing the hammerhead divided by Haseloff and Gerlach (1988, *Nature*, 334, 585-591) into two portions; and Figure 2d is a similar diagram showing the hammerhead

divided by Jeffries and Symons (1989, *Nucl. Acids. Res.*, 17, 1371-1371) into two portions.

Figure 3 is a diagramatic representation of the general structure of a hairpin ribozyme. Helix 2 (H2) is provided with a least 4 base pairs (*i.e.*, n is 1, 2, 3 or 4) and helix 5 can be optionally provided of length 2 or more bases (preferably 3 - 20 bases, *i.e.*, m is from 1 - 20 or more). Helix 2 and helix 5 may be covalently linked by one or more bases (*i.e.*, r is ≥ 1 base). Helix 1, 4 or 5 may also be extended by 2 or more base pairs (*e.g.*, 4 - 20 base pairs) to stabilize the ribozyme structure, and preferably is a protein binding site. In each instance, each N and N' independently is any normal or modified base and each dash represents a potential base-pairing interaction. These nucleotides may be modified at the sugar, base or phosphate. Complete base-pairing is not required in the helices, but is preferred. Helix 1 and 4 can be of any size (*i.e.*, o and p is each independently from 0 to any number, *e.g.*, 20) as long as some base-pairing is maintained. Essential bases are shown as specific bases in the structure, but those in the art will recognize that one or more may be modified chemically (abasic, base, sugar and/or phosphate modifications) or replaced with another base without significant effect. Helix 4 can be formed from two separate molecules, *i.e.*, without a connecting loop. The connecting loop when present may be a ribonucleotide with or without modifications to its base, sugar or phosphate. "q" is ≥ 2 bases. The connecting loop can also be replaced with a non-nucleotide linker molecule. H refers to bases A, U, or C. Y refers to pyrimidine bases. "_____" refers to a covalent bond.

Figure 4 is a representation of the general structure of the hepatitis delta virus ribozyme domain known in the art.

Figure 5 is a representation of the general structure of the VS RNA ribozyme domain.

Figure 6 is a schematic representation of an RNAseH accessibility assay. Specifically, the left side of Figure 6 is a diagram of complementary DNA oligonucleotides bound to accessible sites on the target RNA. Complementary DNA oligonucleotides are represented by broad lines labeled A, B, and C. Target RNA is represented by the thin, twisted line. The right side of Figure 6 is a schematic of a gel separation of uncut target RNA from a cleaved target RNA. Detection of target RNA is by autoradiography of body-labeled, T7 transcript. The bands common to each lane represent uncleaved target RNA; the bands unique to each lane represent the cleaved products.

Figure 7 shows the effect of hammerhead ribozymes targeted against flt-1 receptor on the binding of VEGF to the surface of human microvascular endothelial cells. Sequences of the ribozymes used are shown in Table II; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions (see Figure 11); U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose. The results of two separate experiments are shown as separate bars for each set. Each bar represents the average of triplicate samples. The standard deviation is shown with error bars. For the flt-1 data, 500 nM ribozyme (3:1 charge ratio with LipofectAMINE®) was used. Control 1-10 is the control for ribozymes 307-2797, control 11-20 is the control for ribozymes 3008-5585. The Control 1-10 and Control 11-20 represent the treatment of cells with LipofectAMINE® alone without any ribozymes.

Figure 8 shows the effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF to KDR on the surface of human microvascular endothelial

cells. Sequences of the ribozymes used are shown in Table IV; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions (see Figure 11); U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose. The Control 1-10 and Control 11-20 represent the treatment of cells with LipofectAMINE® alone without any ribozymes. Irrel. RZ, is a control experiment wherein the cells are treated with a non-KDR-targeted ribozyme complexed with Lipofectamine®. 200 nM ribozyme (3:1 charge ratio with LipofectAMINE®) was used. In addition to the KDR-targeted ribozymes, the effect on VEGF binding of a ribozyme targeted to an irrelevant mRNA (irrel. RZ) is also shown. Because the affinity of KDR for VEGF is about 10-fold lower than the affinity of flt-1 for VEGF, a higher concentration of VEGF was used in the binding assay.

Figure 9 shows the specificity of hammerhead ribozymes targeted against flt-1 receptor. Inhibition of the binding of VEGF, urokinase plasminogen activator (UPA) and fibroblast growth factor (FGF) to their corresponding receptors as a function of anti-FLT ribozymes is shown. The sequence and description of the ribozymes used are as described under Figure 7 above. The average of triplicate samples is given; percent inhibition as calculated below.

Figure 10 shows the inhibition of the proliferation of Human aortic endothelial cells (HAEC) mediated by phosphorothioate antisense oligodeoxynucleotides targeted against human KDR receptor RNA. Cell proliferation (O.D. 490) as a function of antisense oligodeoxynucleotide concentration is shown. KDR 21AS represents a 21 nt phosphorothioate antisense oligodeoxynucleotide targeted against KDR RNA. KDR 21 Scram represents a 21 nt

phosphorothioate oligodeoxynucleotide having a scrambled sequence. LF represents the lipid carrier Lipofectin.

Figure 11 shows *in vitro* cleavage of flt-1 RNA by hammerhead ribozymes. A) diagrammatic representation of hammerhead ribozymes targeted against flt-1 RNA. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 1358 HH-A and 4229 HH-A contain 3 base-paired stem II region. 1358 HH-B and 4229 HH-B contain 4 base-paired stem II region. B) and C) shows *in vitro* cleavage kinetics of HH ribozymes targeted against sites 1358 and 4229 within the flt-1 RNA.

Figure 12 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-flt-1 hammerhead ribozymes. A) Diagrammatic representation of hammerhead (HH) ribozymes targeted against sites 1358 and 4229 within the the flt-1 RNA. B) Graphical representation of the inhibition of cell proliferation mediated by 1358HH and 4229HH ribozymes.

Figure 13 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-KDR hammerhead ribozymes. The figure is a graphical representation of the inhibition of cell proliferation mediated by hammerhead ribozymes targeted against sites 527, 730, 3702 and 3950 within the KDR RNA. Irrelevant HH RZ is a hammerhead ribozyme targeted to an irrelevant target. All of these ribozymes, including the Irrelevant HH RZ, were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four

nucleotides at the 5' termini contain phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH).

Figure 14 shows *in vitro* cleavage of KDR RNA by hammerhead ribozymes. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 726 HH and 527 HH contain 4 base-paired stem II region. Percent *in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 527 and 726 within the KDR RNA is shown.

Figure 15 shows *in vitro* cleavage of KDR RNA by hammerhead ribozymes. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH). 3702 HH and 3950 HH contain 4 base-paired stem II region. Percent*in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 3702 and 3950 within the KDR RNA is shown.

Figure 16 shows *in vitro* cleavage of RNA by hammerhead ribozymes that are targeted to sites that are conserved between flt-1 and KDR RNA. The hammerhead (HH) ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (designated as 3'-iH).

FLT/KDR-I HH ribozyme was synthesized with either a 4 base-paired or a 3 base-paired stem II region. FLT/KDR-I HH can cleave site 3388 within flt-1 RNA and site 3151 within KDR RNA. Percent *in vitro* cleavage kinetics as a function of time of HH ribozymes targeted against sites 3702 and 3950 within the KDR RNA is shown.

Figure 17 shows inhibition of human microvascular endothelial cell proliferation mediated by anti-KDR and anti-flt-1 hammerhead ribozymes. The figure is a graphical representation of the inhibition of cell proliferation mediated by hammerhead ribozymes targeted against sites KDR sites-527, 726 or 3950 or flt-1 site 4229. The figure also shows enhanced inhibition of cell proliferation by a combination of flt-1 and KDR hammerhead ribozymes. 4229+527, indicates the treatment of cells with both the flt 4229 and the KDR 527 ribozymes. 4229+726, indicates the treatment of cells with both the flt 4229 and the KDR 726 ribozymes. 4229+3950, indicates the treatment of cells with both the flt 4229 and the KDR 3950 ribozymes. VEGF -, indicates the basal level of cell proliferation in the absence of VEGF. A, indicates catalytically active ribozyme; I, indicates catalytically inactive ribozyme. All of these ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions; four nucleotides at the 5' termini contain phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH).

Figure 18 shows the inhibition of VEGF-induced angiogenesis in rat cornea mediated by anti-flt-1 hammerhead ribozyme. All of these ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 position contains 2'-*C*-allyl modifications, the remaining nucleotide positions contain 2'-*O*-methyl substitutions; four nucleotides at the 5' termini contain

phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose (3'-iH). A decrease in the Surface Area corresponds to a reduction in angiogenesis. VEGF alone, corresponds to treatment of the cornea with VEGF and no ribozymes. Vehicle alone, corresponds to the treatment of the cornea with the carrier alone and no VEGF. This control gives a basal level of Surface Area. Active 4229 HH, corresponds to the treatment of cornea with the flt-1 4229 HH ribozyme in the absence of any VEGF. This control also gives a basal level of Surface Area. Active 4229 HH + VEGF, corresponds to the co-treatment of cornea with the flt-1 4229 HH ribozyme and VEGF. Inactive 4229 HH + VEGF, corresponds to the co-treatment of cornea with a catalytically inactive version of 4229 HH ribozyme and VEGF.

Ribozymes

Ribozymes of this invention block to some extent VEGF-R (specifically flt-1 and flk-1/KDR) production and can be used to treat disease or diagnose such disease. Ribozymes will be delivered to cells in culture, to cells or tissues in animal models of angiogenesis and/or RA and to human cells or tissues *ex vivo* or *in vivo*. Ribozyme cleavage of VEGF-R RNAs (specifically RNAs that encode flt-1 and flk-1/KDR) in these systems may alleviate disease symptoms.

Target sites

Targets for useful ribozymes can be determined as disclosed in Draper *et al.*, International PCT Publication No. WO 95/13380, and hereby incorporated by reference herein in totality. Other examples include the following PCT applications which concern inactivation of expression of disease-related genes: WO 95/23225, WO 95/13380, WO 94/02595, incorporated by reference herein. Rather than repeat the guidance provided in those documents here, below are provided specific examples of such methods, not

limiting to those in the art. Ribozymes to such targets are designed as described in those applications and synthesized to be tested *in vitro* and *in vivo*, as also described.

The sequence of human and mouse flt-1, KDR and/or flk-1 mRNAs were screened for optimal ribozyme target sites using a computer folding algorithm. Hammerhead or hairpin ribozyme cleavage sites were identified. These sites are shown in Tables II to IX (all sequences are 5' to 3' in the tables; X can be any base-paired sequence, the actual sequence is not relevant here). The nucleotide base position is noted in the Tables as that site to be cleaved by the designated type of ribozyme. While mouse and human sequences can be screened and ribozymes thereafter designed, the human targeted sequences are of most utility. However, as discussed in Stinchcomb *et al.*, "Method and Composition for Treatment of Restenosis and Cancer Using Ribozymes," filed May 18, 1994, U.S.S.N. 08/245,466, mouse targeted ribozymes may be useful to test efficacy of action of the ribozyme prior to testing in humans. The nucleotide base position is noted in the Tables as that site to be cleaved by the designated type of ribozyme.

Hammerhead or hairpin ribozymes were designed that could bind and cleave target RNA in a sequence-specific manner. The ribozymes were individually analyzed by computer folding (Jaeger *et al.*, 1989 *Proc. Natl. Acad. Sci. USA*, 86, 7706) to assess whether the ribozyme sequences fold into the appropriate secondary structure. Those ribozymes with unfavorable intramolecular interactions between the binding arms and the catalytic core were eliminated from consideration. Varying binding arm lengths can be chosen to optimize activity.

Referring to Figure 6, mRNA is screened for accessible cleavage sites by the method described generally in Draper *et al.*, PCT WO93/23569, hereby incorporated by reference herein. Briefly, DNA oligonucleotides

complementary to potential hammerhead or hairpin ribozyme cleavage sites were synthesized. A polymerase chain reaction is used to generate substrates for T7 RNA polymerase transcription from human and mouse flt-1, KDR and/or flk-1 cDNA clones. Labeled RNA transcripts are synthesized *in vitro* from the templates. The oligonucleotides and the labeled transcripts were annealed, RNAseH was added and the mixtures were incubated for the designated times at 37°C. Reactions are stopped and RNA separated on sequencing polyacrylamide gels. The percentage of the substrate cleaved is determined by autoradiographic quantitation using a PhosphorImaging system. From these data, hammerhead or hairpin ribozyme sites are chosen as the most accessible.

Ribozymes of the hammerhead or hairpin motif were designed to anneal to various sites in the mRNA message. The binding arms are complementary to the target site sequences described above. The ribozymes were chemically synthesized. The method of synthesis used follows the procedure for normal RNA synthesis as described in Usman *et al.*, 1987 *J. Am. Chem. Soc.*, 109, 7845; Scaringe *et al.*, 1990 *Nucleic Acids Res.*, 18, 5433; and Wincott *et al.*, 1995 *Nucleic Acids Res.* 23, 2677-2684 and makes use of common nucleic acid protecting and coupling groups, such as dimethoxytrityl at the 5'-end, and phosphoramidites at the 3'-end. Small scale synthesis were conducted on a 394 Applied Biosystems, Inc. synthesizer using a modified 2.5 μmol scale protocol with a 5 min coupling step for alkylsilyl protected nucleotides and 2.5 min coupling step for 2'-*O*-methylated nucleotides. Table XI outlines the amounts, and the contact times, of the reagents used in the synthesis cycle. A 6.5-fold excess (163 μL of 0.1 M = 16.3 μmol) of phosphoramidite and a 24-fold excess of *S*-ethyl tetrazole (238 μL of 0.25 M = 59.5 μmol) relative to polymer-bound 5'-hydroxyl was used in each coupling cycle. Average coupling yields on the 394 Applied Biosystems, Inc. synthesizer, determined by

colorimetric quantitation of the trityl fractions, were 97.5-99%. Other oligonucleotide synthesis reagents for the 394 Applied Biosystems, Inc. synthesizer: detritylation solution was 2% TCA in methylene chloride (ABI); capping was performed with 16% *N*-methyl imidazole in THF (ABI) and 10% acetic anhydride/10% 2,6-lutidine in THF (ABI); oxidation solution was 16.9 mM I_2, 49 mM pyridine, 9% water in THF (Millipore). B & J Synthesis Grade acetonitrile was used directly from the reagent bottle. *S*-Ethyl tetrazole solution (0.25 M in acetonitrile) was made up from the solid obtained from American International Chemical, Inc.

Deprotection of the RNA was performed as follows. The polymer-bound oligoribonucleotide, trityl-off, was transferred from the synthesis column to a 4mL glass screw top vial and suspended in a solution of methylamine (MA) at 65 °C for 10 min. After cooling to -20 °C, the supernatant was removed from the polymer support. The support was washed three times with 1.0 mL of EtOH:MeCN:H_2O/3:1:1, vortexed and the supernatant was then added to the first supernatant. The combined supernatants, containing the oligoribonucleotide, were dried to a white powder.

The base-deprotected oligoribonucleotide was resuspended in anhydrous TEA•HF/NMP solution (250 µL of a solution of 1.5mL *N*-methylpyrrolidinone, 750 µL TEA and 1.0 mL TEA•3HF to provide a 1.4M HF concentration) and heated to 65°C for 1.5 h. The resulting, fully deprotected, oligomer was quenched with 50 mM TEAB (9 mL) prior to anion exchange desalting.

For anion exchange desalting of the deprotected oligomer, the TEAB solution was loaded onto a Qiagen 500® anion exchange cartridge (Qiagen Inc.) that was prewashed with 50 mM TEAB (10 mL). After washing the loaded cartridge with 50 mM TEAB (10 mL), the RNA was eluted with 2 M TEAB (10 mL) and dried down to a white powder.

Inactive hammerhead ribozymes were synthesized by substituting a U for G_5 and a U for A_{14} (numbering from

Hertel, K. J., *et al.*, 1992, Nucleic Acids Res., 20, 3252).

The average stepwise coupling yields were >98% (Wincott *et al.*, 1995 *Nucleic Acids Res.* 23, 2677-2684).

Hairpin ribozymes are synthesized in two parts and annealed to reconstruct the active ribozyme (Chowrira and Burke, 1992 *Nucleic Acids Res.*, 20, 2835-2840). Ribozymes are also synthesized from DNA templates using bacteriophage T7 RNA polymerase (Milligan and Uhlenbeck, 1989, *Methods Enzymol.* 180, 51).

All ribozymes are modified extensively to enhance stability by modification with nuclease resistant groups, for example, 2'-amino, 2'-*C*-allyl, 2'-flouro, 2'-*O*-methyl, 2'-H (for a review see Usman and Cedergren, 1992 *TIBS* 17, 34; Usman *et al.*, 1994 *Nucleic Acids Symp. Ser.* 31, 163). Ribozymes are purified by gel electrophoresis using general methods or are purified by high pressure liquid chromatography (HPLC; See Usman *et al.*, PCT Publication No. WO95/23225, the totality of which is hereby incorporated herein by reference) and are resuspended in water.

The sequences of the ribozymes that are chemically synthesized, useful in this study, are shown in Tables II to IX. Those in the art will recognize that these sequences are representative only of many more such sequences where the enzymatic portion of the ribozyme (all but the binding arms) is altered to affect activity. Stem-loop IV sequence of hairpin ribozymes listed in for example Table III (5'-CACGUUGUG-3') can be altered (substitution, deletion, and/or insertion) to contain any sequence, provided a minimum of two base-paired stem structure can form. The sequences listed in Tables II to IX may be formed of ribonucleotides or other nucleotides or non-nucleotides. Such ribozymes are equivalent to the ribozymes described specifically in the Tables.

Optimizing Ribozyme Activity

Ribozyme activity can be optimized as described by Stinchcomb *et al.*, supra. The details will not be repeated here, but include altering the length of the ribozyme binding arms (stems I and III, see Figure 2c), or chemically synthesizing ribozymes with modifications that prevent their degradation by serum ribonucleases (see *e.g.*, Eckstein *et al.*, International Publication No. WO 92/07065; Perrault *et al.*, 1990 *Nature* 344, 565; Pieken *et al.*, 1991 *Science* 253, 314; Usman and Cedergren, 1992 *Trends in Biochem. Sci.* 17, 334; Usman *et al.*, International Publication No. WO 93/15187; Rossi *et al.*, International Publication No. WO 91/03162; Beigelman et al., 1995 *J. Biol Chem.* in press; as well as Sproat, US Patent No. 5,334,711 which describe various chemical modifications that can be made to the sugar moieties of enzymatic RNA molecules). Modifications which enhance their efficacy in cells, and removal of stem II bases to shorten RNA synthesis times and reduce chemical requirements are desired. (All these publications are hereby incorporated by reference herein).

Sullivan, *et al.*, *supra*, describes the general methods for delivery of enzymatic RNA molecules. Ribozymes may be administered to cells by a variety of methods known to those familiar to the art, including, but not restricted to, encapsulation in liposomes, by iontophoresis, or by incorporation into other vehicles, such as hydrogels, cyclodextrins, biodegradable nanocapsules, and bioadhesive microspheres. For some indications, ribozymes may be directly delivered *ex vivo* to cells or tissues with or without the aforementioned vehicles. Alternatively, the RNA/vehicle combination is locally delivered by direct injection or by use of a catheter, infusion pump or stent. Other routes of delivery include, but are not limited to, intravascular, intramuscular, subcutaneous or joint injection, aerosol inhalation, oral (tablet or pill form), topical, systemic, ocular, intraperitoneal and/or intra-

thecal delivery. More detailed descriptions of ribozyme delivery and administration are provided in Sullivan *et al.*, supra and Draper *et al.*, *supra* which have been incorporated by reference herein.

Another means of accumulating high concentrations of a ribozyme(s) within cells is to incorporate the ribozyme-encoding sequences into a DNA or RNA expression vector. Transcription of the ribozyme sequences are driven from a promoter for eukaryotic RNA polymerase I (pol I), RNA polymerase II (pol II), or RNA polymerase III (pol III). Transcripts from pol II or pol III promoters will be expressed at high levels in all cells; the levels of a given pol II promoter in a given cell type will depend on the nature of the gene regulatory sequences (enhancers, silencers, *etc.*) present nearby. Prokaryotic RNA polymerase promoters are also used, providing that the prokaryotic RNA polymerase enzyme is expressed in the appropriate cells (Elroy-Stein and Moss, 1990 *Proc. Natl. Acad. Sci. U S A*, 87, 6743-7; Gao and Huang 1993 *Nucleic Acids Res.*, 21, 2867-72; Lieber *et al.*, 1993 *Methods Enzymol.*, 217, 47-66; Zhou *et al.*, 1990 *Mol. Cell. Biol.*, 10, 4529-37; Thompson *et al.*, 1995 *supra*). Several investigators have demonstrated that ribozymes expressed from such promoters can function in mammalian cells (*e.g.* Kashani-Sabet *et al.*, 1992 *Antisense Res. Dev.*, 2, 3-15; Ojwang *et al.*, 1992 *Proc. Natl. Acad. Sci. U S A*, 89, 10802-6; Chen *et al.*, 1992 *Nucleic Acids Res.*, 20, 4581-9; Yu *et al.*, 1993 *Proc. Natl. Acad. Sci. U S A*, 90, 6340-4; L'Huillier *et al.*, 1992 *EMBO J.* 11, 4411-8; Lisziewicz *et al.*, 1993 *Proc. Natl. Acad. Sci. U. S. A.*, 90, 8000-4; Thompson et al., 1995 *Nucleic Acids Res.* 23, 2259). The above ribozyme transcription units can be incorporated into a variety of vectors for introduction into mammalian cells, including but not restricted to, plasmid DNA vectors, viral DNA vectors (such as adenovirus or adeno-associated virus vectors), or viral RNA vectors (such as retroviral or alphavirus vectors).

In a preferred embodiment of the invention, a transcription unit expressing a ribozyme that cleaves RNAs that encode flt-1, KDR and/or flk-1 are inserted into a plasmid DNA vector or an adenovirus or adeno-associated virus DNA viral vector or a retroviral RNA vector. Viral vectors have been used to transfer genes and lead to either transient or long term gene expression (Zabner *et al.*, 1993 Cell 75, 207; Carter, 1992 Curr. Opi. Biotech. 3, 533). The adenovirus, AAV or retroviral vector is delivered as recombinant viral particles. The DNA may be delivered alone or complexed with vehicles (as described for RNA above). The recombinant adenovirus or AAV or retroviral particles are locally administered to the site of treatment, e.g., through incubation or inhalation *in vivo* or by direct application to cells or tissues *ex vivo*. Retroviral vectors have also been used to express ribozymes in mammalian cells (Ojwang *et al.*, 1992 *supra*; Thompson *et al.*, 1995 *supra*).

flt-1, KDR and/or flk-1 are attractive nucleic acid-based therapeutic targets by several criteria. The interaction between VEGF and VEGF-R is well-established. Efficacy can be tested in well-defined and predictive animal models. Finally, the disease conditions are serious and current therapies are inadequate. Whereas protein-based therapies would inhibit VEGF activity nucleic acid-based therapy provides a direct and elegant approach to directly modulate flt-1, KDR and/or flk-1 expression.

Because flt-1 and KDR mRNAs are highly homologous in certain regions, some ribozyme target sites are also homologous (see Table X). In this case, a single ribozyme will target both flt-1 and KDR mRNAs. At partially homologous sites, a single ribozyme can sometimes be designed to accomodate a site on both mRNAs by including G/U basepairing. For example, if there is a G present in a ribozyme target site in KDR mRNA at the same position there is an A in the flt-1 ribozyme target site, the

ribozyme can be synthesized with a U at the complementary position and it will bind both to sites. The advantage of one ribozyme that targets both VEGF-R mRNAs is clear, especially in cases where both VEGF receptors may contribute to the progression of angiogenesis in the disease state.

"Angiogenesis" refers to formation of new blood vessels which is an essential process in reproduction, development and wound repair. "Tumor angiogenesis" refers to the induction of the growth of blood vessels from surrounding tissue into a solid tumor. Tumor growth and tumor metastasis are dependent on angiogenesis (for a review see Folkman, 1985 *supra*; Folkman 1990 *J. Natl. Cancer Inst.*, 82, 4; Folkman and Shing, 1992 *J. Biol. Chem.* 267, 10931).

Angiogenesis plays an important role in other diseases such as arthritis wherein new blood vessels have been shown to invade the joints and degrade cartilage (Folkman and Shing, *supra*).

"Retinopathy" refers to inflammation of the retina and/or degenerative condition of the retina which may lead to occlusion of the retina and eventual blindness. In "diabetic retinopathy" angiogenesis causes the capillaries in the retina to invade the vitreous resulting in bleeding and blindness which is also seen in neonatal retinopathy (for a review see Folkman, 1985 *supra*; Folkman 1990 *supra*; Folkman and Shing, 1992 *supra*).

Example 1: flt-1, KDR and/or flk-1 ribozymes

By engineering ribozyme motifs applicant has designed several ribozymes directed against flt-1, KDR and/or flk-1 encoded mRNA sequences. These ribozymes were synthesized with modifications that improve their nuclease resistance (Beigelman *et al.*, 1995 *J Biol. Chem.* 270, 25702) and enhance their activity in cells. The ability of ribozymes to cleave target sequences *in vitro* was evaluated essentially as described in Thompson *et al.*, PCT Publication

No. WO 93/23057; Draper *et al.*, PCT Publication No. WO 95/04818.

Example 2: Effect of ribozymes on the binding of VEGF to flt-1, KDR and/or flk-1 receptors

Several common human cell lines are available that express endogenous flt-1, KDR and/or flk-1. flt-1, KDR and/or flk-1 can be detected easily with monoclonal antibodies. Use of appropriate fluorescent reagents and fluorescence-activated cell-sorting (FACS) will permit direct quantitation of surface flt-1, KDR and/or flk-1 on a cell-by-cell basis. Active ribozymes are expected to directly reduce flt-1, KDR and/or flk-1 expression and thereby reduce VEGF binding to the cells. In this example, human umbelical cord microvascular endothelial cells were used.

Cell Preparation:

Plates are coated with 1.5% gelatin and allowed to stand for one hour. Cells (e.g., microvascular endothelial cells derived from human umbilical cord vein) are plated at 20,000 cells/well (24 well plate) in 200 ml growth media and incubated overnight (~ 1 doubling) to yield ~40,000 cells (75-80% confluent).

Ribozyme treatment:

Media is removed from cells and the cells are washed two times with 300 ml 1X PBS: Ca^{2+}: Mg^{2+} mixture. A complex of 200-500 nM ribozyme and LipofectAMINE® (3:1 lipid: phosphate ratio) in 200 ml OptiMEM® (5% FBS) was added to the cells. The cells are incubated for 6 hr (equivalent to 2-3 VEGF-R turnovers).

^{125}I VEGF binding assay:

The assay is carried out on ice to inhibit internalization of VEGF during the experiment. The media containing the ribozyme is removed from the cells and the cells

are washed twice with with 300 ml 1X PBS: Ca^{2+}: Mg^{2+} mixture containing 1% BSA. Appropriate ^{125}I VEGF solution (100,000 cpm/well, +/- 10 X cold 1X PBS, 1% BSA) was applied to the cells. The cells are incubated on ice for 1 h. ^{125}I VEGF-containing solution is removed and the cells are washed three times with with 300 ml 1X PBS: Ca^{2+}: Mg^{2+} mixture containing 1% BSA. To each well 300 ml of 100 mM Tris-HCl, pH 8.0, 0.5% Triton X-100 was added and the the mixture was incubated for 2 min. The ^{125}I VEGF-binding was quantitated using standard scintillation counting techniques. Percent inhibition was calculated as follows:

$$\text{Percent Inhibition} = \frac{\text{cpm } ^{125}I \text{ VEGF bound by the ribozyme-treated samples}}{\text{cpm } ^{125}I \text{ VEGF bound by the Control sample}} \times 100$$

Example 3: Effect of hammerhead ribozymes targeted against flt-1 receptor on the binding of VEGF

Hammerhead ribozymes targeted to twenty sites within flt-1 RNA were synthesized as described above. Sequence of the ribozymes used are shown in Table II; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, 3' end of the ribozyme contains a 3'-3' linked inverted abasic ribose.

Referring to Figure 7, the effect of hammerhead ribozymes targeted against flt-1 receptor on the binding of VEGF to flt-1 on the surface of human microvascular endothelial cells is shown. The majority of the ribozymes tested were able to inhibit the expression of flt-1 and thereby were able to inhibit the binding of VEGF.

In order to determine the specificity of ribozymes targeted against flt-1 RNA, the effect of five anti-flt-1 ribozymes on the binding of VEGF, UPA (urokinase plasmino-

gen activator) and FGF (fibroblast growth factor) to their corresponding receptors were assayed. As shown in Figure 9, there was significant inhibition of VEGF binding to its receptors on cells treated with anti-flt-1 ribozymes. There was no specific inhibition of the binding of UPA and FGF to their corresponding receptors. These data strongly suggest that anti-flt-1 ribozymes specifically cleave flt-1 RNA and not RNAs encoding the receptors for UPA and FGF, resulting in the inhibition of flt-1 receptor expression on the surface of the cells. Thus the ribozymes are responsible for the inhibition of VEGF binding but not the binding of UPA and FGF.

Example 4: Effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF

Hammerhead ribozymes targeted to twenty one sites within KDR RNA were synthesized as described above. Sequence of the ribozymes used are shown in Table IV; the length of stem II region is 3 bp. The hammerhead ribozymes were chemically modified such that the ribozyme consists of ribose residues at five positions; U4 and U7 positions contain 2'-NH_2 modifications, the remaining nucleotide positions contain 2'-O-methyl substitutions; four nucleotides at the 5' terminus contains phosphorothioate substitutions. Additionally, the 3' end of the ribozyme contains a 3'-3' linked inverted abasic deoxyribose.

Referring to Figure 8, the effect of hammerhead ribozymes targeted against KDR receptor on the binding of VEGF to KDR on the surface of human microvascular endothelial cells is shown. A majority of the ribozymes tested were able to inhibit the expression of KDR and thereby were able to inhibit the binding of VEGF. As a control, the cells were treated with a ribozyme that is not targeted towards KDR RNA (irrel. RZ); there was no specific inhibition of VEGF binding. The results from this control experiment strongly suggest that the inhibi-

tion of VEGF binding observed with anti-KDR ribozymes is a ribozyme-mediated inhibition.

Example 5: Effect of ribozymes targeted against VEGF receptors on cell proliferation

Cell Preparation:

24-well plates are coated with 1.5% gelatin (porcine skin 300 bloom). After 1 hr, excess gelatin is washed off of the plate. Microvascular endothelial cells are plated at 5,000 cells/well (24 well plate) in 200 ml growth media. The cells are allowed to grow for ~ 18 hr (~ 1 doubling) to yield ~10,000 cells (25-30% confluent).

Ribozyme treatment:

Media is removed from the cells, and the cells are washed two times with 300 ml 1X PBS: Ca^{2+}: Mg^{2+} mixture.

For anti-flt-1 HH ribozyme experiment (Figure 12) a complex of 500 nM ribozyme; 15 mM LFA (3:1 lipid:phosphate ratio) in 200 ml OptiMEM (5% FCS) media was added to the cells. Incubation of cells is carried out for 6 hr (equivalent to 2-3 VEGF receptor turnovers).

For anti-KDR HH ribozyme experiment (Figure 13) a complex of 200 nM ribozyme; 5.25 mM LFA (3:1 lipid: phosphate ratio) in 200 ml OptiMEM (5% FCS) media was added to the cells. Incubation of cells is carried out for 3 hr.

Proliferation:

After three or six hours, the media is removed from the cells and the cells are washed with 300 ml 1X PBS: Ca^{2+}: Mg^{2+} mixture. Maintenance media (contains dialyzed 10% FBS) +/- VEGF or basic FGF at 10 ng/ml is added to the cells. The cells are incubated for 48 or 72 h. The cells are trypsinized and counted (Coulter counter). Trypan blue is added on one well of each treatment as control.

As shown in Figure 12B, VEGF and basic FGF can stimulate human microvascular endothelial cell proliferation. However, treatment of cells with 1358 HH or 4229 HH ribozymes, targeted against flt-1 mRNA, results in a significant decrease in the ability of VEGF to stimulate endothelial cell proliferation. These ribozymes do not inhibit the FGF-mediated stimulation of endothelial cell proliferation.

Human microvascular endothalial cells were also treated with hammerhead ribozymes targeted against sites 527, 730, 3702 or 3950 within the KDR mRNA. As shown in Figure 13, all four ribozymes caused significant inhibition of VEGF-mediated induction of cell proliferation. No significant inhibition of cell proliferation was observed when the cells were treated with a hammerhead ribozyme targeted to an irrelevant RNA. Additionally, none of the ribozymes inhibited FGF-mediated stimulation of cell proliferation.

These results strongly suggest that hammerhead ribozymes targeted against either flt-1 or KDR mRNA can specifically inhibit VEGF-mediated induction of endothelial cell proliferation.

Example 6: Effect of antisense oligonucleotides targeted against VEGF receptors on cell proliferation (colorimetric assay)

Following are some of the reagents used in the proliferation assay:

Cells: Human aortic endothelial cells (HAEC) from Clonetics®. Cells at early passage are preferably used.

Uptake Medium: EBM (from Clonetics®);1% L-Glutamine;20 mM Hepes; No serum; No antibiotics.

Growth Medium: EGM (from Clonetics®);FBS to 20%;1% L-Glutamine;20 mM Hepes.

Cell Plating: 96-well tissue culture plates are coated with 0.2% gelatin (50 ml/well). The gelatin is incubated in the wells at room temperature for 15-30

minutes. The gelatin is removed by aspiration and the wells are washed with PBS:Ca^{2+}: Mg^{2+} mixture. PBS mixture is left in the wells until cells are ready to be added. HAEC cells were detached by trypsin treatment and resuspended at 1.25 x 10^4/ml in growth medium. PBS is removed from plates and 200 ml of cells (i.e. 2.5 x 10^3 cells/well) are added to each well. The cells are allowed to grow for 48 hours before the proliferation assay.

Assay: Growth medium is removed from the wells. The cells are washed twice with PBS:Ca^{2+}: Mg^{2+} mixture without antibiotics. A formulation of lipid/antisense oligonucleotide (antisense oligonucleotide is used here as a non-limiting example) complex is added to each well (100 ml/well) in uptake medium. The cells are incubated for 2-3 hours at 37°C in CO_2 incubator. After uptake, 100 ml/well of growth medium is added (gives final FBS concentration of 10%). After approximately 72 hours, 40 ml MTS® stock solution (made as described by manufacturer) was added to each well and incubated at 37°C for 1-3 hours, depending on the color development. (For this assay, 2 hours was sufficient). The intensity of color formation was determined on a plate reader at 490 nM.

Phosphorothioate-substituted antisense oligodeoxynucleotides were custom synthesized by The Midland Certified Reagent Company®, Midland, Texas. Following non-limiting antisense oligodeoxynucleotides targeted against KDR RNA were used in the proliferation assay:

KDR 21 AS: 5'-GCA GCA CCT TGC TCT CCA TCC-3'

SCRAMBLED CONTROL: 5'-CTG CCA ACT TCC CAT GCC TGC-3'

As shown in Figure 10, proliferation of HAEC cells are specifically inhibited by increasing concentrations of the phosphorothioate anti-KDR-antisense oligodeoxynucleotide. The scrambled antisense oligonucleotide is not expected to bind the KDR RNA and therefore is not expected to inhibit KDR expression. As expected, there is no detectable inhibition of proliferation of HAEC cells

treated with a phosphorothioate antisense oligonucleotide with scrambled sequence.

Example 7: *In vitro* cleavage of flt-1 RNA by hammerhead ribozymes

Referring to Figure 11A, hammerhead ribozymes (HH) targeted against sites 1358 and 4229 within the flt-1 RNA were synthesized as described above.

RNA cleavage assay *in vitro*:

Substrate RNA was 5' end-labeled using [g-^{32}P] ATP and T4 polynucleotide kinase (US Biochemicals). Cleavage reactions were carried out under ribozyme "excess" conditions. Trace amount (≤ 1 nM) of 5' end-labeled substrate and 40 nM unlabeled ribozyme were denatured and renatured separately by heating to 90°C for 2 min and snap-cooling on ice for 10-15 min. The ribozyme and substrate were incubated, separately, at 37°C for 10 min in a buffer containing 50 mM Tris-HCl and 10 mM $MgCl_2$. The reaction was initiated by mixing the ribozyme and substrate solutions and incubating at 37°C. Aliquots of 5 ml are taken at regular intervals of time and the reaction is quenched by mixing with equal volume of 2X formamide stop mix. The samples are resolved on 20 % denaturing polyacrylamide gels. The results were quantified and percentage of target RNA cleaved is plotted as a function of time.

Referring to Figure 11B and 11C, hammerhead ribozymes targeted against sites 1358 and 4229 within the flt-1 RNA are capable of cleaving target RNA efficiently *in vitro*.

Example 8: *In vitro* cleavage of KDR RNA by hammerhead ribozymes

In this non-limiting example, hammerhead ribozymes targeted against sites 726, 527, 3702 and 3950 within KDR RNA were synthesized as described above. RNA cleavage reactions were carried out *in vitro* essentially as described under Example 7.

Referring to Figures 14 and 15, all four ribozymes were able to cleave their cognate target RNA efficiently in a sequence-specific manner.

Example 9: *In vitro* cleavage of RNA by hammerhead ribozymes targeted against cleavage sites that are homologous between KDR and flt-1 mRNA

Because flt-1 and KDR mRNAs are highly homologous in certain regions, some ribozyme target sites are also homologous (see Table X). In this case, a single ribozyme will target both flt-1 and KDR mRNAs. Hammerhead ribozyme (FLT/KDR-I) targeted against one of the homologous sites between flt-1 and KDR (flt-1 site 3388 and KDR site 3151) was synthesized as described above. Ribozymes with either a 3 bp stem II or a 4 bp stem II were synthesized. RNA cleavage reactions were carried out *in vitro* essentially as described under Example 7.

Referring to Figure 16, FLT/KDR-I ribozyme with either a 3 or a 4 bp stem II was able to cleave its target RNA efficiently *in vitro*.

Example 10: Effect of multiple ribozymes targeted against both flt-1 and KDR RNA on cell proliferation

Since both flt-1 and KDR receptors of VEGF are involved in angiogenesis, the inhibition of the expression of both of these genes may be an effective approach to inhibit angiogenesis.

Human microvascular endothalial cells were treated with hammerhead ribozymes targeted against sites flt-1 4229 alone, KDR 527 alone, KDR 726 alone, KDR 3950 alone, flt-1 4229 + KDR 527, flt-1 4229 + KDR 726 or flt-1 4229 + KDR 3950. As shown in Figure 17, all the combinations of active ribozymes (A) caused significant inhibition of VEGF-mediated induction of cell proliferation. No significant inhibition of cell proliferation was observed when the cells were treated with a catalytically inactive (I) hammerhead ribozymes. Additionally, cells treated

with ribozymes targeted against both flt-1 and KDR RNAs- flt-1 4229 + KDR 527; flt-1 4229 + KDR 726; flt-1 4229 + KDR 3950, were able to cause a greater inhibition of VEGF-mediated induction of cell proliferation when compared with individual ribozymes targeted against either flt-1 or KDR RNA (see flt-1 4229 alone; KDR 527 alone; KDR 726 alone; KDR 3950 alone). This strongly suggests that treatment of cells with multiple ribozymes may be a more effective means of inhibition of gene expression.

Animal Models

There are several animal models in which the anti-angiogenesis effect of nucleic acids of the present invention, such as ribozymes, directed against VEGF-R mRNAs can be tested. Typically a corneal model has been used to study angiogenesis in rat and rabbit since recruitment of vessels can easily be followed in this normally avascular tissue (Pandey *et al.*, 1995 *Science* 268: 567-569). In these models, a small Teflon or Hydron disk pretreated with an angiogenesis factor (e.g. bFGF or VEGF) is inserted into a pocket surgically created in the cornea. Angiogenesis is monitored 3 to 5 days later. Ribozymes directed against VEGF-R mRNAs would be delivered in the disk as well, or dropwise to the eye over the time course of the experiment. In another eye model, hypoxia has been shown to cause both increased expression of VEGF and neovascularization in the retina (Pierce *et al.*, 1995 *Proc. Natl. Acad. Sci.* USA. 92: 905-909; Shweiki *et al.*, 1992 *J. Clin. Invest.* 91: 2235-2243).

In human glioblastomas, it has been shown that VEGF is at least partially responsible for tumor angiogenesis (Plate *et al.*, 1992 *Nature* 359, 845). Animal models have been developed in which glioblastoma cells are implanted subcutaneously into nude mice and the progress of tumor growth and angiogenesism is studied (Kim *et al.*, 1993 *supra;* Millauer *et al.*, 1994 *supra*).

Another animal model that addresses neovascularization involves Matrigel, an extract of basement membrane that becomes a solid gel when injected subcutaneously (Passaniti *et al.*, 1992 *Lab. Invest.* 67: 519-528). When the Matrigel is supplemented with angiogenesis factors such as VEGF, vessels grow into the Matrigel over a period of 3 to 5 days and angiogenesis can be assessed. Again, ribozymes directed against VEGF-R mRNAs would be delivered in the Matrigel.

Several animal models exist for screening of anti-angiogenic agents. These include corneal vessel formation following corneal injury (Burger *et al.*, 1985 *Cornea* 4: 35-41; Lepri, *et al.*, 1994 *J. Ocular Pharmacol.* 10: 273-280; Ormerod *et al.*, 1990 *Am. J. Pathol.* 137: 1243-1252) or intracorneal growth factor implant (Grant *et al.*, 1993 *Diabetologia* 36: 282-291; Pandey *et al.* 1995 *supra;* Zieche *et al.*, 1992 *Lab. Invest.* 67: 711-715), vessel growth into Matrigel matrix containing growth factors (Passaniti *et al.*, 1992 *supra*), female reproductive organ neovascularization following hormonal manipulation (Shweiki *et al.*, 1993 *Clin. Invest.* 91: 2235-2243), several models involving inhibition of tumor growth in highly vascularized solid tumors (O'Reilly *et al.*, 1994 *Cell* 79: 315-328; Senger *et al.*, 1993 *Cancer and Metas. Rev.* 12: 303-324; Takahasi *et al.*, 1994 *Cancer Res.* 54: 4233-4237; Kim *et al.*, 1993 *supra*), and transient hypoxia-induced neovascularization in the mouse retina (Pierce *et al.*, 1995 *Proc. Natl. Acad. Sci.* USA. 92: 905-909).

The cornea model, described in Pandey et al. *supra*, is the most common and well characterized anti-angiogenic agent efficacy screening model. This model involves an avascular tissue into which vessels are recruited by a stimulating agent (growth factor, thermal or alkalai burn, endotoxin). The corneal model would utilize the intrastromal corneal implantation of a Teflon pellet soaked in a VEGF-Hydron solution to recruit blood vessels toward the pellet which can be quantitated using standard microscopic

and image analysis techniques. To evaluate their anti-angiogenic efficacy, ribozymes are applied topically to the eye or bound within Hydron on the Teflon pellet itself. This avascular cornea as well as the Matrigel (see below) provide for low background assays. While the corneal model has been performed extensively in the rabbit, studies in the rat have also been conducted.

The mouse model (Passaniti et al., *supra*) is a non-tissue model which utilizes Matrigel, an extract of basement membrane (Kleinman et al., 1986) or Millipore® filter disk, which can be impregnated with growth factors and anti-angiogenic agents in a liquid form prior to injection. Upon subcutaneous administration at body temperature, the Matrigel or Millipore® filter disk forms a solid implant. VEGF embedded in the Matrigel or Millipore® filter disk would be used to recruit vessels within the matrix of the Matrigel or Millipore® filter disk which can be processed histologically for endothelial cell specific vWF (factor VIII antigen) immunohistochemistry, Trichrome-Masson stain, or hemoglobin content. Like the cornea, the Matrigel or Millipore® filter disk are avascular; however, it is not tissue. In the Matrigel or Millipore® filter disk model, ribozymes are administered within the matrix of the Matrigel or Millipore® filter disk to test their anti-angiogenic efficacy. Thus, delivery issues in this model, as with delivery of ribozymes by Hydron-coated Teflon pellets in the rat cornea model, may be less problematic due to the homogeneous presence of the ribozyme within the respective matrix.

These models offer a distinct advantage over several other angiogenic models listed previously. The ability to use VEGF as a pro-angiogenic stimulus in both models is highly desirable since ribozymes will target only VEGFr mRNA. In other words, the involvement of other non-specific types of stimuli in the cornea and Matrigel models is not advantageous from the standpoint of understanding the pharmacologic mechanism by which the

anti-VEGFr mRNA ribozymes produce their effects. In addition, the models will allow for testing the specificity of the anti-VEGFr mRNA ribozymes by using either a- or bFGF as a pro-angiogenic factor. Vessel recruitment using FGF should not be affected in either model by anti-VEGFr mRNA ribozymes. Other models of angiogenesis including vessel formation in the female reproductive system using hormonal manipulation (Shweiki *et al.*, 1993 *supra*); a variety of vascular solid tumor models which involve indirect correlations with angiogenesis (O'Reilly *et al.*, 1994 *supra*; Senger *et al.*, 1993 *supra*; Takahasi *et al.*, 1994 *supra*; Kim *et al.*, 1993 *supra*); and retinal neovascularization following transient hypoxia (Pierce *et al.*, 1995 *supra*) were not selected for efficacy screening due to their non-specific nature, although there is a correlation between VEGF and angiogenesis in these models.

Other model systems to study tumor angiogenesis is reviewed by Folkman, 1985 *Adv. Cancer. Res.*. 43, 175.

flt-1, KDR and/or flk-1 protein levels can be measured clinically or experimentally by FACS analysis. flt-1, KDR and/or flk-1 encoded mRNA levels will be assessed by Northern analysis, RNase-protection, primer extension analysis and/or quantitative RT-PCR. Ribozymes that block flt-1, KDR and/or flk-1 protein encoding mRNAs and therefore result in decreased levels of flt-1, KDR and/or flk-1 activity by more than 20% *in vitro* will be identified.

Ribozymes and/or genes encoding them are delivered by either free delivery, liposome delivery, cationic lipid delivery, adeno-associated virus vector delivery, adenovirus vector delivery, retrovirus vector delivery or plasmid vector delivery in these animal model experiments (see above).

Patients can be treated by locally administering nucleic acids targeted against VEGF-R by direct injection. Routes of administration may include, but are not limited to, intravascular, intramuscular, subcutaneous, intra-

articular, aerosol inhalation, oral (tablet, capsule or pill form), topical, systemic, ocular, intraperitoneal and/or intrathecal delivery.

Example 11: Ribozyme-mediated inhibition of angiogenesis *in vivo*

The purpose ot this study was to assess the anti-angiogenic activity of hammerhead ribozymes targeted against flt-1 4229 site in the rat cornea model of VEGF induced angiogenesis (see above). These ribozymes have either active or inactive catalytic core and either bind and cleave or just bind to VEGF-R mRNA of the flt-1 subtype. The active ribozymes, that are able to bind and cleave the target RNA, have been shown to inhibit (^{125}I-labeled) VEGF binding in cultured endothelial cells and produce a dose-dependent decrease in VEGF induced endothelial cell proliferation in these cells (see Examples 3-5 above). The catalytically inactive forms of these ribozymes, wherein the ribozymes can only bind to the RNA but cannot catalyze RNA cleavage, fail to show these characteristics. The ribozymes and VEGF were co-delivered using the filter disk method: Nitrocellulose filter disks (Millipore®) of 0.057 diameter were immersed in appropriate solutions and were surgically implanted in rat cornea as described by Pandey *et al., supra*. This delivery method has been shown to deliver rhodamine-labeled free ribozyme to scleral cells and, in all likelihood cells of the pericorneal vascular plexus. Since the active ribozymes show cell culture efficacy and can be delivered to the target site using the disk method, it is essential that these ribozymes be assessed for *in vivo* anti-angiogenic activity.

The stimulus for angiogenesis in this study was the treatment of the filter disk with 30 mM VEGF which is implanted within the cornea's stroma. This dose yields reproducible neovascularization stemming from the peri-corneal vascular plexus growing toward the disk in a

dose-response study 5 days following implant. Filter disks treated only with the vehicle for VEGF show no angiogenic response. The ribozymes was co-adminstered with VEGF on a disk in two different ribozyme concentrations. One concern with the simultaneous administration is that the ribozymes will not be able to inhibit angiogenesis since VEGF receptors can be stimulated. However, we have observed that in low VEGF doses, the neovascular response reverts to normal suggesting that the VEGF stimulus is essential for maintaining the angiogenic response. Blocking the production of VEGF receptors using simultaneous administration of anti-VEGF-R mRNA ribozymes could attenuate the normal neovascularization induced by the filter disk treated with VEGF.

Materials and Methods:

1. Stock hammerhead ribozyme solutions:
   a. flt-1 4229 (786 μM)- Active
   b. flt-1 4229 (736 μM)- Inactive

2. Experimantal solutions/groups:

Group 1	Solution 1	Control VEGF solution: 30 μM in 82mM Tris base
Group 2	Solution 2	flt-1 4229 (1 μg/μL) in 30 μM VEGF/82 mM Tris base
Group 3	Solution 3	flt-1 4229 (10 μg/μL) in 30 μM VEGF/82 mM Tris base
Group 4	Solution 4	No VEGF, flt-1 4229 (10 μg/μL) in 82 mM Tris base
Group 5	Solution 5	No VEGF, No ribozyme in 82 mM Tris base

10 eyes per group, 5 animals (Since they have similar molecular weights, the molar concentrations should be essentially similar).

Each solution (VEGF and RIBOZYMES) were prepared as a 2X solution for 1:1 mixing for final concentrations

above, with the exception of solution 1 in which VEGF was 2X and diluted with ribozyme diluent (sterile water).

3. VEGF Solutions

The 2X VEGF solution (60 μM) was prepared from a stock of 0.82 μg/μL in 50 mM Tris base. 200 μL of VEGF stock was concentrated by speed vac to a final volume of 60.8 μL, for a final concentration of 2.7 μg/μL or 60 μM. Six 10 μL aliquots was prepared for daily mixing. 2X solutions for VEGF and Ribozyme was stored at 4°C until the day of the surgery. Solutions were mixed for each day of surgery. Original 2X solutions was prepared on the day before the first day of the surgery.

4. Surgical Solutions:

Anesthesia:

stock ketamine hydrochloride 100 mg/mL
stock xylazine hydrochloride 20 mg/mL
stock acepromazine 10 mg/mL

Final anesthesia solution: 50 mg/mL ketamine, 10 mg/mL xylazine, and 0.5 mg/mL acepromazine

5% povidone iodine for opthalmic surgical wash

2% lidocaine (sterile) for opthalmic administration (2 drops per eye)

sterile 0.9% NaCl for opthalmic irrigation

5. Surgical Methods:

Standard surgical procedure as described in Pandey *et al., supra*. Filter disks were incubated in 1 μL of each solution for approximately 30 minutes prior to implantation.

5. Experimental Protocol:

The animal cornea were treated with the treatment groups as described above. Animals were allowed to recover for 5 days after treatment with daily observation (scoring 0 - 3). On the fifth day animals were euthanized and

digital images of each eye was obtained for quantitaion using Image Pro Plus. Quantitated neovascular surface area were analyzed by ANOVA followed by two post-hoc tests including Dunnets and Tukey-Kramer tests for significance at the 95% confidence level. Dunnets provide information on the significance between the differences within the means of treatments vs. controls while Tukey-Kramer provide information on the significance of differences within the means of each group.

Results are graphically represented in Figure 18. As shown in the figure, flt-1 4229 active hammerhead ribozyme at both concentrations was effective at inhibiting angiogenesis while the inactive ribozyme did not show any significant reduction in angiogenesis. A statistically signifiant reduction in neovascular surface area was observed only with active ribozymes. This result clearly shows that the ribozymes are capable of significantly inhibiting angiogenesis *in vivo*. Specifically, the mechanism of inhibition appears to be by the binding and cleavage of target RNA by ribozymes.

Diagnostic uses

Ribozymes of this invention may be used as diagnostic tools to examine genetic drift and mutations within diseased cells or to detect the presence of flt-1, KDR and/or flk-1 RNA in a cell. The close relationship between ribozyme activity and the structure of the target RNA allows the detection of mutations in any region of the molecule which alters the base-pairing and three-dimensional structure of the target RNA. By using multiple ribozymes described in this invention, one may map nucleotide changes which are important to RNA structure and function *in vitro*, as well as in cells and tissues. Cleavage of target RNAs with ribozymes may be used to inhibit gene expression and define the role (essentially) of specified gene products in the progression of disease. In this manner, other genetic targets

may be defined as important mediators of the disease. These experiments will lead to better treatment of the disease progression by affording the possibility of combinational therapies (*e.g.*, multiple ribozymes targeted to different genes, ribozymes coupled with known small molecule inhibitors, or intermittent treatment with combinations of ribozymes and/or other chemical or biological molecules). Other *in vitro* uses of ribozymes of this invention are well known in the art, and include detection of the presence of mRNAs associated with flt-1, KDR and/or flk-1 related condition. Such RNA is detected by determining the presence of a cleavage product after treatment with a ribozyme using standard methodology.

In a specific example, ribozymes which can cleave only wild-type or mutant forms of the target RNA are used for the assay. The first ribozyme is used to identify wild-type RNA present in the sample and the second ribozyme will be used to identify mutant RNA in the sample. As reaction controls, synthetic substrates of both wild-type and mutant RNA will be cleaved by both ribozymes to demonstrate the relative ribozyme efficiencies in the reactions and the absence of cleavage of the "non-targeted" RNA species. The cleavage products from the synthetic substrates will also serve to generate size markers for the analysis of wild-type and mutant RNAs in the sample population. Thus each analysis will require two ribozymes, two substrates and one unknown sample which will be combined into six reactions. The presence of cleavage products will be determined using an RNAse protection assay so that full-length and cleavage fragments of each RNA can be analyzed in one lane of a polyacrylamide gel. It is not absolutely required to quantify the results to gain insight into the expression of mutant RNAs and putative risk of the desired phenotypic changes in target cells. The expression of mRNA whose protein product is implicated in the development of the phenotype (*i.e.*, flt-1, KDR and/or flk-1) is adequate to establish

risk. If probes of comparable specific activity are used for both transcripts, then a qualitative comparison of RNA levels will be adequate and will decrease the cost of the initial diagnosis. Higher mutant form to wild-type ratios will be correlated with higher risk whether RNA levels are compared qualitatively or quantitatively.

Other embodiments are within the following claims.

Table I

Characteristics of Ribozymes

Group I Introns

Size: ~200 to >1000 nucleotides

Requires a U in the target sequence immediately 5' of the cleavage site.

Binds 4-6 nucleotides at 5' side of cleavage site.

Over 75 known members of this class. Found in *Tetrahymena thermophila* rRNA, fungal mitochondria, chloroplasts, phage T4, blue-green algae, and others.

RNAseP RNA (M1 RNA)

Size: ~290 to 400 nucleotides

RNA portion of a ribonucleoprotein enzyme. Cleaves tRNA precursors to form mature tRNA.

Roughly 10 known members of this group all are bacterial in origin.

Hammerhead Ribozyme

Size: ~13 to 40 nucleotides.

Requires the target sequence UH immediately 5' of the cleavage site.

Binds a variable number of nucleotides on both sides of the cleavage site.

14 known members of this class. Found in a number of plant pathogens (virusoids) that use RNA as the infectious agent (Figure 1 and 2)

Hairpin Ribozyme

Size: ~50 nucleotides.

Requires the target sequence GUC immediately 3' of the cleavage site.

Binds 4-6 nucleotides at 5' side of the cleavage site and a variable number to the 3' side of the cleavage site.

Only 3 known member of this class. Found in three plant pathogen (satellite RNAs of the tobacco ringspot virus,

arabis mosaic virus and chicory yellow mottle virus) which uses RNA as the infectious agent (Figure 3).

Hepatitis Delta Virus (HDV) Ribozyme
Size: 50-60 nucleotides (at present)
Sequence requirements not fully determined.
Binding sites and structural requirements not fully determined, although no sequences 5' of cleavage site are required.
Only 1 known member of this class. Found in human HDV (Figure 4).

Neurospora VS RNA Ribozyme
Size: ~144 nucleotides (at present)
Cleavage of target RNAs recently demonstrated.
Sequence requirements not fully determined.
Binding sites and structural requirements not fully determined. Only 1 known member of this class. Found in *Neurospora* VS RNA (Figure 5).

Table II: Human *flt1* VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Position	HH Ribozyme	Substrate
10	GCCGAGAG CUGAUGA X GAA AGUGUCCG	CGGACACUC CUCUCGGC
13	GGAGCCGA CUGAUGA X GAA AGGAGUGU	ACACUCCUC UCGGCUCC
15	GAGGAGCC CUGAUGA X GAA AGAGGAGU	ACUCCUCUC GGCUCCUC
20	CCGGGGAG CUGAUGA X GAA AGCCGAGA	UCUCGGCUC CUCCCCGG
23	CUGCCGGG CUGAUGA X GAA AGGAGCCG	CGGCUCCUC CCCGGCAG
43	CCCGCUCC CUGAUGA X GAA AGCCGCCG	CGGCGGCUC GGAGCGGG
54	GAGCCCCG CUGAUGA X GAA AGCCCGCU	AGCGGGCUC CGGGGCUC
62	CUGCACCC CUGAUGA X GAA AGCCCCGG	CCGGGGCUC GGGUGCAG
97	CCCCGGGU CUGAUGA X GAA AUCCUCGC	GCGAGGAUU ACCCGGGG
98	UCCCCGGG CUGAUGA X GAA AAUCCUCG	CGAGGAUUA CCCGGGGA

	113	CAGGAGAC	CUGAUGA	X	GAA	ACCACUUC	GAAGUGGUU	GUCUCCUG
	116	AGCCAGGA	CUGAUGA	X	GAA	ACAACCAC	GUGGUUGUC	UCCUGGCU
	118	CCAGCCAG	CUGAUGA	X	GAA	AGACAACC	GGUUGUCUC	CUGGCUGG
	145	CGCGCCCU	CUGAUGA	X	GAA	AGCGCCCG	CGGGCGCUC	AGGGCGCG
5	185	GGCCGCCA	CUGAUGA	X	GAA	AGUCCGUC	GACGGACUC	UGGCGGCC
	198	CGGCCAAC	CUGAUGA	X	GAA	ACCCGGCC	GGCCGGGUC	GUUGGCCG
	201	CCCCGGCC	CUGAUGA	X	GAA	ACGACCCG	CGGGUCGUU	GGCCGGGG
	240	GUGAGCGC	CUGAUGA	X	GAA	ACGCGGCC	GGCCGCGUC	GCGCUCAC
	246	ACCAUGGU	CUGAUGA	X	GAA	AGCGCGAC	GUCGCGCUC	ACCAUGGU
10	255	CAGUAGCU	CUGAUGA	X	GAA	ACCAUGGU	ACCAUGGUC	AGCUACUG
	260	UGUCCCAG	CUGAUGA	X	GAA	AGCUGACC	GGUCAGCUA	CUGGGACA
	276	CACAGCAG	CUGAUGA	X	GAA	ACCCCGGU	ACCGGGGUC	CUGCUGUG
	294	AGACAGCU	CUGAUGA	X	GAA	AGCAGCGC	GCGCUGCUC	AGCUGUCU
	301	GAGAAGCA	CUGAUGA	X	GAA	ACAGCUGA	UCAGCUGUC	UGCUUCUC
15	306	CCUGUGAG	CUGAUGA	X	GAA	AGCAGACA	UGUCUGCUU	CUCACAGG
	307	UCCUGUGA	CUGAUGA	X	GAA	AAGCAGAC	GUCUGCUUC	UCACAGGA
	309	GAUCCUGU	CUGAUGA	X	GAA	AGAAGCAG	CUGCUUCUC	ACAGGAUC
	317	CUGAACUA	CUGAUGA	X	GAA	AUCCUGUG	CACAGGAUC	UAGUUCAG
	319	ACCUGAAC	CUGAUGA	X	GAA	AGAUCCUG	CAGGAUCUA	GUUCAGGU
20	322	UGAACCUG	CUGAUGA	X	GAA	ACUAGAUC	GAUCUAGUU	CAGGUUCA
	323	UUGAACCU	CUGAUGA	X	GAA	AACUAGAU	AUCUAGUUC	AGGUUCAA
	328	UAAUUUUG	CUGAUGA	X	GAA	ACCUGAAC	GUUCAGGUU	CAAAAUUA
	329	UUAAUUUU	CUGAUGA	X	GAA	AACCUGAA	UUCAGGUUC	AAAAUUAA
	335	GAUCUUUU	CUGAUGA	X	GAA	AUUUUGAA	UUCAAAAUU	AAAAGAUC
25	336	GGAUCUUU	CUGAUGA	X	GAA	AAUUUUGA	UCAAAAUUA	AAAGAUCC
	343	CAGUUCAG	CUGAUGA	X	GAA	AUCUUUUA	UAAAAGAUC	CUGAACUG
	355	GCCUUUUA	CUGAUGA	X	GAA	ACUCAGUU	AACUGAGUU	UAAAAGGC
	356	UGCCUUUU	CUGAUGA	X	GAA	AACUCAGU	ACUGAGUUU	AAAAGGCA
	357	GUGCCUUU	CUGAUGA	X	GAA	AAACUCAG	CUGAGUUUA	AAAGGCAC
30	375	GCUUGCAU	CUGAUGA	X	GAA	AUGUGCUG	CAGCACAUC	AUGCAAGC
	400	GCAUUGGA	CUGAUGA	X	GAA	AUGCAGUG	CACUGCAUC	UCCAAUGC
	402	CUGCAUUG	CUGAUGA	X	GAA	AGAUGCAG	CUGCAUCUC	CAAUGCAG
	427	AGACCAUU	CUGAUGA	X	GAA	AUGGGCUG	CAGCCCAUA	AAUGGUCU

434	CAGGCAAA CUGAUGA X GAA	ACCAUUUA	UAAAUGGUC UUUGCCUG
436	UUCAGGCA CUGAUGA X GAA	AGACCAUU	AAUGGUCUU UGCCUGAA
437	UUUCAGGC CUGAUGA X GAA	AAGACCAU	AUGGUCUUU GCCUGAAA
454	GCUUUCCU CUGAUGA X GAA	ACUCACCA	UGGUGAGUA AGGAAAGC
477	GAUUUAGU CUGAUGA X GAA	AUGCUCAG	CUGAGCAUA ACUAAAUC
481	GGCAGAUU CUGAUGA X GAA	AGUUAUGC	GCAUAACUA AAUCUGCC
485	CACAGGCA CUGAUGA X GAA	AUUUAGUU	AACUAAAUC UGCCUGUG
512	UACUGCAG CUGAUGA X GAA	AUUGUUUG	CAAACAAUU CUGCAGUA
513	GUACUGCA CUGAUGA X GAA	AAUUGUUU	AAACAAUUC UGCAGUAC
520	GGUUAAAG CUGAUGA X GAA	ACUGCAGA	UCUGCAGUA CUUUAACC
523	CAAGGUUA CUGAUGA X GAA	AGUACUGC	GCAGUACUU UAACCUUG
524	UCAAGGUU CUGAUGA X GAA	AAGUACUG	CAGUACUUU AACCUUGA
525	UUCAAGGU CUGAUGA X GAA	AAAGUACU	AGUACUUUA ACCUUGAA
530	CUGUGUUC CUGAUGA X GAA	AGGUUAAA	UUUAACCUU GAACACAG
541	GUUUGCUU CUGAUGA X GAA	AGCUGUGU	ACACAGCUC AAGCAAAC
560	AGCUGUAG CUGAUGA X GAA	AGCCAGUG	CACUGGCUU CUACAGCU
561	CAGCUGUA CUGAUGA X GAA	AAGCCAGU	ACUGGCUUC UACAGCUG
563	UGCAGCUG CUGAUGA X GAA	AGAAGCCA	UGGCUUCUA CAGCUGCA
575	CAGCUAGA CUGAUGA X GAA	AUUUGCAG	CUGCAAAUA UCUAGCUG
577	UACAGCUA CUGAUGA X GAA	AUAUUUGC	GCAAAUAUC UAGCUGUA
579	GGUACAGC CUGAUGA X GAA	AGAUAUUU	AAAUAUCUA GCUGUACC
585	GAAGUAGG CUGAUGA X GAA	ACAGCUAG	CUAGCUGUA CCUACUUC
589	CUUUGAAG CUGAUGA X GAA	AGGUACAG	CUGUACCUA CUUCAAAG
592	CUUCUUUG CUGAUGA X GAA	AGUAGGUA	UACCUACUU CAAAGAAG
593	UCUUCUUU CUGAUGA X GAA	AAGUAGGU	ACCUACUUC AAAGAAGA
614	AGAUUGCA CUGAUGA X GAA	AUUCUGUU	AACAGAAUC UGCAAUCU
621	AAUAUAUA CUGAUGA X GAA	AUUGCAGA	UCUGCAAUC UAUAUAUU
623	UAAAUAUA CUGAUGA X GAA	AGAUUGCA	UGCAAUCUA UAUAUUUA
625	AAUAAAUA CUGAUGA X GAA	AUAGAUUG	CAAUCUAUA UAUUUAUU
627	CUAAUAAA CUGAUGA X GAA	AUAUAGAU	AUCUAUAUA UUUAUUAG
629	CACUAAUA CUGAUGA X GAA	AUAUAUAG	CUAUAUAUU UAUUAGUG
630	UCACUAAU CUGAUGA X GAA	AAUAUAUA	UAUAUAUUU AUUAGUGA
631	AUCACUAA CUGAUGA X GAA	AAAUAUAU	AUAUAUUUA UUAGUGAU

	633	GUAUCACU	CUGAUGA X GAA	AUAAAUAU	AUAUUUAUU AGUGAUAC
	634	UGUAUCAC	CUGAUGA X GAA	AAUAAAUA	UAUUUAUUA GUGAUACA
	640	UCUACCUG	CUGAUGA X GAA	AUCACUAA	UUAGUGAUA CAGGUAGA
	646	GAAAGGUC	CUGAUGA X GAA	ACCUGUAU	AUACAGGUA GACCUUUC
5	652	CUCUACGA	CUGAUGA X GAA	AGGUCUAC	GUAGACCUU UCGUAGAG
	653	UCUCUACG	CUGAUGA X GAA	AAGGUCUA	UAGACCUUU CGUAGAGA
	654	AUCUCUAC	CUGAUGA X GAA	AAAGGUCU	AGACCUUUC GUAGAGAU
	657	UACAUCUC	CUGAUGA X GAA	ACGAAAGG	CCUUUCGUA GAGAUGUA
	665	UUUCACUG	CUGAUGA X GAA	ACAUCUCU	AGAGAUGUA CAGUGAAA
10	675	AUUUCGGG	CUGAUGA X GAA	AUUUCACU	AGUGAAAUC CCCGAAAU
	684	AUGUGUAU	CUGAUGA X GAA	AUUUCGGG	CCCGAAAUU AUACACAU
	685	CAUGUGUA	CUGAUGA X GAA	AAUUUCGG	CCGAAAUUA UACACAUG
	687	GUCAUGUG	CUGAUGA X GAA	AUAAUUUC	GAAAUUAUA CACAUGAC
	711	GGAAUGAC	CUGAUGA X GAA	AGCUCCCU	AGGGAGCUC GUCAUUCC
15	714	CAGGGAAU	CUGAUGA X GAA	ACGAGCUC	GAGCUCGUC AUUCCCUG
	717	CGGCAGGG	CUGAUGA X GAA	AUGACGAG	CUCGUCAUU CCCUGCCG
	718	CCGGCAGG	CUGAUGA X GAA	AAUGACGA	UCGUCAUUC CCUGCCGG
	729	GGUGACGU	CUGAUGA X GAA	ACCCGGCA	UGCCGGGUU ACGUCACC
	730	AGGUGACG	CUGAUGA X GAA	AACCCGGC	GCCGGGUUA CGUCACCU
20	734	UGUUAGGU	CUGAUGA X GAA	ACGUAACC	GGUUACGUC ACCUAACA
	739	AGUGAUGU	CUGAUGA X GAA	AGGUGACG	CGUCACCUA ACAUCACU
	744	GUAACAGU	CUGAUGA X GAA	AUGUUAGG	CCUAACAUC ACUGUUAC
	750	UUUAAAGU	CUGAUGA X GAA	ACAGUGAU	AUCACUGUU ACUUUAAA
	751	UUUUAAAG	CUGAUGA X GAA	AACAGUGA	UCACUGUUA CUUUAAAA
25	754	CUUUUUUA	CUGAUGA X GAA	AGUAACAG	CUGUUACUU UAAAAAAG
	755	ACUUUUUU	CUGAUGA X GAA	AAGUAACA	UGUUACUUU AAAAAAGU
	756	AACUUUUU	CUGAUGA X GAA	AAAGUAAC	GUUACUUUA AAAAAGUU
	764	CAAGUGGA	CUGAUGA X GAA	ACUUUUUU	AAAAAAGUU UCCACUUG
	765	UCAAGUGG	CUGAUGA X GAA	AACUUUUU	AAAAAGUUU CCACUUGA
30	766	GUCAAGUG	CUGAUGA X GAA	AAACUUUU	AAAAGUUUC CACUUGAC
	771	AAAGUGUC	CUGAUGA X GAA	AGUGGAAA	UUUCCACUU GACACUUU
	778	AGGGAUCA	CUGAUGA X GAA	AGUGUCAA	UUGACACUU UGAUCCCU
	779	CAGGGAUC	CUGAUGA X GAA	AAGUGUCA	UGACACUUU GAUCCCUG

	783	CCAUCAGG	CUGAUGA	X	GAA	AUCAAAGU	ACUUUGAUC	CCUGAUGG
	801	UCCCAGAU	CUGAUGA	X	GAA	AUGCGUUU	AAACGCAUA	AUCUGGGA
	804	CUGUCCCA	CUGAUGA	X	GAA	AUUAUGCG	CGCAUAAUC	UGGGACAG
	814	GCCCUUUC	CUGAUGA	X	GAA	ACUGUCCC	GGGACAGUA	GAAAGGGC
5	824	AUAUGAUG	CUGAUGA	X	GAA	AGCCCUUU	AAAGGGCUU	CAUCAUAU
	825	GAUAUGAU	CUGAUGA	X	GAA	AAGCCCUU	AAGGGCUUC	AUCAUAUC
	828	UUUGAUAU	CUGAUGA	X	GAA	AUGAAGCC	GGCUUCAUC	AUAUCAAA
	831	GCAUUUGA	CUGAUGA	X	GAA	AUGAUGAA	UUCAUCAUA	UCAAAUGC
	833	UUGCAUUU	CUGAUGA	X	GAA	AUAUGAUG	CAUCAUAUC	AAAUGCAA
10	845	UUUCUUUG	CUGAUGA	X	GAA	ACGUUGCA	UGCAACGUA	CAAAGAAA
	855	AGAAGCCC	CUGAUGA	X	GAA	AUUUCUUU	AAAGAAAUA	GGGCUUCU
	861	CAGGUCAG	CUGAUGA	X	GAA	AGCCCUAU	AUAGGGCUU	CUGACCUG
	862	ACAGGUCA	CUGAUGA	X	GAA	AAGCCCUA	UAGGGCUUC	UGACCUGU
	882	UGCCCAUU	CUGAUGA	X	GAA	ACUGUUGC	GCAACAGUC	AAUGGGCA
15	892	CUUAUACA	CUGAUGA	X	GAA	AUGCCCAU	AUGGGCAUU	UGUAUAAG
	893	UCUUAUAC	CUGAUGA	X	GAA	AAUGCCCA	UGGGCAUUU	GUAUAAGA
	896	UUGUCUUA	CUGAUGA	X	GAA	ACAAAUGC	GCAUUUGUA	UAAGACAA
	898	GUUUGUCU	CUGAUGA	X	GAA	AUACAAAU	AUUUGUAUA	AGACAAAC
	908	GUGUGAGA	CUGAUGA	X	GAA	AGUUUGUC	GACAAACUA	UCUCACAC
20	910	AUGUGUGA	CUGAUGA	X	GAA	AUAGUUUG	CAAACUAUC	UCACACAU
	912	CGAUGUGU	CUGAUGA	X	GAA	AGAUAGUU	AACUAUCUC	ACACAUCG
	919	GGUUUGUC	CUGAUGA	X	GAA	AUGUGUGA	UCACACAUC	GACAAACC
	931	UAUGAUUG	CUGAUGA	X	GAA	AUUGGUUU	AAACCAAUA	CAAUCAUA
	936	ACAUCUAU	CUGAUGA	X	GAA	AUUGUAUU	AAUACAAUC	AUAGAUGU
25	939	UGGACAUC	CUGAUGA	X	GAA	AUGAUUGU	ACAAUCAUA	GAUGUCCA
	945	CUUAUUUG	CUGAUGA	X	GAA	ACAUCUAU	AUAGAUGUC	CAAAUAAG
	951	GGUGUGCU	CUGAUGA	X	GAA	AUUUGGAC	GUCCAAAUA	AGCACACC
	969	AGUAAUUU	CUGAUGA	X	GAA	ACUGGGCG	CGCCCAGUC	AAAUUACU
	974	CUCUAAGU	CUGAUGA	X	GAA	AUUUGACU	AGUCAAAUU	ACUUAGAG
30	975	CCUCUAAG	CUGAUGA	X	GAA	AAUUUGAC	GUCAAAUUA	CUUAGAGG
	978	UGGCCUCU	CUGAUGA	X	GAA	AGUAAUUU	AAAUUACUU	AGAGGCCA
	979	AUGGCCUC	CUGAUGA	X	GAA	AAGUAAUU	AAUUACUUA	GAGGCCAU
	988	GACAAGAG	CUGAUGA	X	GAA	AUGGCCUC	GAGGCCAUA	CUCUUGUC

	991	GAGGACAA	CUGAUGA	X	GAA	AGUAUGGC	GCCAUACUC	UUGUCCUC
	993	UUGAGGAC	CUGAUGA	X	GAA	AGAGUAUG	CAUACUCUU	GUCCUCAA
	996	CAAUUGAG	CUGAUGA	X	GAA	ACAAGAGU	ACUCUUGUC	CUCAAUUG
	999	GUACAAUU	CUGAUGA	X	GAA	AGGACAAG	CUUGUCCUC	AAUUGUAC
5	1003	AGCAGUAC	CUGAUGA	X	GAA	AUUGAGGA	UCCUCAAUU	GUACUGCU
	1006	GGUAGCAG	CUGAUGA	X	GAA	ACAAUUGA	UCAAUUGUA	CUGCUACC
	1012	GGGAGUGG	CUGAUGA	X	GAA	AGCAGUAC	GUACUGCUA	CCACUCCC
	1018	GUUCAAGG	CUGAUGA	X	GAA	AGUGGUAG	CUACCACUC	CCUUGAAC
	1022	UCGUGUUC	CUGAUGA	X	GAA	AGGGAGUG	CACUCCCUU	GAACACGA
10	1035	GUCAUUUG	CUGAUGA	X	GAA	ACUCUCGU	ACGAGAGUU	CAAAUGAC
	1036	GGUCAUUU	CUGAUGA	X	GAA	AACUCUCG	CGAGAGUUC	AAAUGACC
	1051	AUCAGGGU	CUGAUGA	X	GAA	ACUCCAGG	CCUGGAGUU	ACCCUGAU
	1052	CAUCAGGG	CUGAUGA	X	GAA	AACUCCAG	CUGGAGUUA	CCCUGAUG
	1069	AGCUCUCU	CUGAUGA	X	GAA	AUUUUUUU	AAAAAAAUA	AGAGAGCU
15	1078	CCUUACGG	CUGAUGA	X	GAA	AGCUCUCU	AGAGAGCUU	CCGUAAGG
	1079	GCCUUACG	CUGAUGA	X	GAA	AAGCUCUC	GAGAGCUUC	CGUAAGGC
	1083	CGUCGCCU	CUGAUGA	X	GAA	ACGGAAGC	GCUUCCGUA	AGGCGACG
	1095	CUUUGGUC	CUGAUGA	X	GAA	AUUCGUCG	CGACGAAUU	GACCAAAG
	1108	GGCAUGGG	CUGAUGA	X	GAA	AUUGCUUU	AAAGCAAUU	CCCAUGCC
20	1109	UGGCAUGG	CUGAUGA	X	GAA	AAUUGCUU	AAGCAAUUC	CCAUGCCA
	1122	CUGUAGAA	CUGAUGA	X	GAA	AUGUUGGC	GCCAACAUA	UUCUACAG
	1124	CACUGUAG	CUGAUGA	X	GAA	AUAUGUUG	CAACAUAUU	CUACAGUG
	1125	ACACUGUA	CUGAUGA	X	GAA	AAUAUGUU	AACAUAUUC	UACAGUGU
	1127	GAACACUG	CUGAUGA	X	GAA	AGAAUAUG	CAUAUUCUA	CAGUGUUC
25	1134	AUAGUAAG	CUGAUGA	X	GAA	ACACUGUA	UACAGUGUU	CUUACUAU
	1135	AAUAGUAA	CUGAUGA	X	GAA	AACACUGU	ACAGUGUUC	UUACUAUU
	1137	UCAAUAGU	CUGAUGA	X	GAA	AGAACACU	AGUGUUCUU	ACUAUUGA
	1138	GUCAAUAG	CUGAUGA	X	GAA	AAGAACAC	GUGUUCUUA	CUAUUGAC
	1141	UUUGUCAA	CUGAUGA	X	GAA	AGUAAGAA	UUCUUACUA	UUGACAAA
30	1143	AUUUUGUC	CUGAUGA	X	GAA	AUAGUAAG	CUUACUAUU	GACAAAAU
	1173	CAAGUAUA	CUGAUGA	X	GAA	AGUCCUUU	AAAGGACUU	UAUACUUG
	1174	ACAAGUAU	CUGAUGA	X	GAA	AAGUCCUU	AAGGACUUU	AUACUUGU
	1175	GACAAGUA	CUGAUGA	X	GAA	AAAGUCCU	AGGACUUUA	UACUUGUC

	1177	ACGACAAG	CUGAUGA	X	GAA	AUAAAGUC	GACUUUAUA	CUUGUCGU
	1180	UACACGAC	CUGAUGA	X	GAA	AGUAUAAA	UUUAUACUU	GUCGUGUA
	1183	CCUUACAC	CUGAUGA	X	GAA	ACAAGUAU	AUACUUGUC	GUGUAAGG
	1188	CCACUCCU	CUGAUGA	X	GAA	ACACGACA	UGUCGUGUA	AGGAGUGG
5	1202	AUUUGAAU	CUGAUGA	X	GAA	AUGGUCCA	UGGACCAUC	AUUCAAAU
	1205	CAGAUUUG	CUGAUGA	X	GAA	AUGAUGGU	ACCAUCAUU	CAAAUCUG
	1206	ACAGAUUU	CUGAUGA	X	GAA	AAUGAUGG	CCAUCAUUC	AAAUCUGU
	1211	UGUUAACA	CUGAUGA	X	GAA	AUUUGAAU	AUUCAAAUC	UGUUAACA
	1215	GAGGUGUU	CUGAUGA	X	GAA	ACAGAUUU	AAAUCUGUU	AACACCUC
10	1216	UGAGGUGU	CUGAUGA	X	GAA	AACAGAUU	AAUCUGUUA	ACACCUCA
	1223	UAUGCACU	CUGAUGA	X	GAA	AGGUGUUA	UAACACCUC	AGUGCAUA
	1231	AUCAUAUA	CUGAUGA	X	GAA	AUGCACUG	CAGUGCAUA	UAUAUGAU
	1233	UUAUCAUA	CUGAUGA	X	GAA	AUAUGCAC	GUGCAUAUA	UAUGAUAA
	1235	CUUUAUCA	CUGAUGA	X	GAA	AUAUAUGC	GCAUAUAUA	UGAUAAAG
15	1240	GAAUGCUU	CUGAUGA	X	GAA	AUCAUAUA	UAUAUGAUA	AAGCAUUC
	1247	CAGUGAUG	CUGAUGA	X	GAA	AUGCUUUA	UAAAGCAUU	CAUCACUG
	1248	ACAGUGAU	CUGAUGA	X	GAA	AAUGCUUU	AAAGCAUUC	AUCACUGU
	1251	UUCACAGU	CUGAUGA	X	GAA	AUGAAUGC	GCAUUCAUC	ACUGUGAA
	1264	CUGUUUUC	CUGAUGA	X	GAA	AUGUUUCA	UGAAACAUC	GAAAACAG
20	1281	ACGGUUUC	CUGAUGA	X	GAA	AGCACCUG	CAGGUGCUU	GAAACCGU
	1290	UUGCCAGC	CUGAUGA	X	GAA	ACGGUUUC	GAAACCGUA	GCUGGCAA
	1304	GCCGGUAA	CUGAUGA	X	GAA	ACCGCUUG	CAAGCGGUC	UUACCGGC
	1306	GAGCCGGU	CUGAUGA	X	GAA	AGACCGCU	AGCGGUCUU	ACCGGCUC
	1307	AGAGCCGG	CUGAUGA	X	GAA	AAGACCGC	GCGGUCUUA	CCGGCUCU
25	1314	UUCAUAGA	CUGAUGA	X	GAA	AGCCGGUA	UACCGGCUC	UCUAUGAA
	1316	CUUUCAUA	CUGAUGA	X	GAA	AGAGCCGG	CCGGCUCUC	UAUGAAAG
	1318	CACUUUCA	CUGAUGA	X	GAA	AGAGAGCC	GGCUCUCUA	UGAAAGUG
	1334	GCGAGGGA	CUGAUGA	X	GAA	AUGCCUUC	GAAGGCAUU	UCCCUCGC
	1335	GGCGAGGG	CUGAUGA	X	GAA	AAUGCCUU	AAGGCAUUU	CCCUCGCC
30	1336	CGGCGAGG	CUGAUGA	X	GAA	AAAUGCCU	AGGCAUUUC	CCUCGCCG
	1340	CUUCCGGC	CUGAUGA	X	GAA	AGGGAAAU	AUUUCCCUC	GCCGGAAG
	1350	AACCAUAC	CUGAUGA	X	GAA	ACUUCCGG	CCGGAAGUU	GUAUGGUU
	1353	UUUAACCA	CUGAUGA	X	GAA	ACAACUUC	GAAGUUGUA	UGGUUAAA

	1358	CAUCUUUU	CUGAUGA	X	GAA	ACCAUACA	UGUAUGGUU	AAAAGAUG
	1359	CCAUCUUU	CUGAUGA	X	GAA	AACCAUAC	GUAUGGUUA	AAAGAUGG
	1370	UCGCAGGU	CUGAUGA	X	GAA	ACCCAUCU	AGAUGGGUU	ACCUGCGA
	1371	GUCGCAGG	CUGAUGA	X	GAA	AACCCAUC	GAUGGGUUA	CCUGCGAC
5	1388	AGCGAGCA	CUGAUGA	X	GAA	AUUUCUCA	UGAGAAAUC	UGCUCGCU
	1393	CAAAUAGC	CUGAUGA	X	GAA	AGCAGAUU	AAUCUGCUC	GCUAUUUG
	1397	GAGUCAAA	CUGAUGA	X	GAA	AGCGAGCA	UGCUCGCUA	UUUGACUC
	1399	ACGAGUCA	CUGAUGA	X	GAA	AUAGCGAG	CUCGCUAUU	UGACUCGU
	1400	CACGAGUC	CUGAUGA	X	GAA	AAUAGCGA	UCGCUAUUU	GACUCGUG
10	1405	GUAGCCAC	CUGAUGA	X	GAA	AGUCAAAU	AUUUGACUC	GUGGCUAC
	1412	UUAACGAG	CUGAUGA	X	GAA	AGCCACGA	UCGUGGCUA	CUCGUUAA
	1415	UAAUUAAC	CUGAUGA	X	GAA	AGUAGCCA	UGGCUACUC	GUUAAUUA
	1418	UGAUAAUU	CUGAUGA	X	GAA	ACGAGUAG	CUACUCGUU	AAUUAUCA
	1419	UUGAUAAU	CUGAUGA	X	GAA	AACGAGUA	UACUCGUUA	AUUAUCAA
15	1422	UCCUUGAU	CUGAUGA	X	GAA	AUUAACGA	UCGUUAAUU	AUCAAGGA
	1423	GUCCUUGA	CUGAUGA	X	GAA	AAUUAACG	CGUUAAUUA	UCAAGGAC
	1425	ACGUCCUU	CUGAUGA	X	GAA	AUAAUUAA	UUAAUUAUC	AAGGACGU
	1434	UCUUCAGU	CUGAUGA	X	GAA	ACGUCCUU	AAGGACGUA	ACUGAAGA
	1456	GAUUGUAU	CUGAUGA	X	GAA	AUUCCCUG	CAGGGAAUU	AUACAAUC
20	1457	AGAUUGUA	CUGAUGA	X	GAA	AAUUCCCU	AGGGAAUUA	UACAAUCU
	1459	CAAGAUUG	CUGAUGA	X	GAA	AUAAUUCC	GGAAUUAUA	CAAUCUUG
	1464	CUCAGCAA	CUGAUGA	X	GAA	AUUGUAUA	UAUACAAUC	UUGCUGAG
	1466	UGCUCAGC	CUGAUGA	X	GAA	AGAUUGUA	UACAAUCUU	GCUGAGCA
	1476	GACUGUUU	CUGAUGA	X	GAA	AUGCUCAG	CUGAGCAUA	AAACAGUC
25	1484	ACACAUUU	CUGAUGA	X	GAA	ACUGUUUU	AAAACAGUC	AAAUGUGU
	1493	GGUUUUUA	CUGAUGA	X	GAA	ACACAUUU	AAAUGUGUU	UAAAAACC
	1494	AGGUUUUU	CUGAUGA	X	GAA	AACACAUU	AAUGUGUUU	AAAAACCU
	1495	GAGGUUUU	CUGAUGA	X	GAA	AAACACAU	AUGUGUUUA	AAAACCUC
	1503	GUGGCAGU	CUGAUGA	X	GAA	AGGUUUUU	AAAAACCUC	ACUGCCAC
30	1513	GACAAUUA	CUGAUGA	X	GAA	AGUGGCAG	CUGCCACUC	UAAUUGUC
	1515	UUGACAAU	CUGAUGA	X	GAA	AGAGUGGC	GCCACUCUA	AUUGUCAA
	1518	ACAUUGAC	CUGAUGA	X	GAA	AUUAGAGU	ACUCUAAUU	GUCAAUGU
	1521	UUCACAUU	CUGAUGA	X	GAA	ACAAUUAG	CUAAUUGUC	AAUGUGAA

1539	UUUUCGUA	CUGAUGA	X	GAA	AUCUGGGG	CCCCAGAUU	UACGAAAA
1540	CUUUUCGU	CUGAUGA	X	GAA	AAUCUGGG	CCCAGAUUU	ACGAAAAG
1541	CCUUUUCG	CUGAUGA	X	GAA	AAAUCUGG	CCAGAUUUA	CGAAAAGG
1556	GAAACGAU	CUGAUGA	X	GAA	ACACGGCC	GGCCGUGUC	AUCGUUUC
1559	CUGGAAAC	CUGAUGA	X	GAA	AUGACACG	CGUGUCAUC	GUUUCCAG
1562	GGUCUGGA	CUGAUGA	X	GAA	ACGAUGAC	GUCAUCGUU	UCCAGACC
1563	GGGUCUGG	CUGAUGA	X	GAA	AACGAUGA	UCAUCGUUU	CCAGACCC
1564	CGGGUCUG	CUGAUGA	X	GAA	AAACGAUG	CAUCGUUUC	CAGACCCG
1576	UGGGUAGA	CUGAUGA	X	GAA	AGCCGGGU	ACCCGGCUC	UCUACCCA
1578	AGUGGGUA	CUGAUGA	X	GAA	AGAGCCGG	CCGGCUCUC	UACCCACU
1580	CCAGUGGG	CUGAUGA	X	GAA	AGAGAGCC	GGCUCUCUA	CCCACUGG
1602	CAAGUCAG	CUGAUGA	X	GAA	AUUUGUCU	AGACAAAUC	CUGACUUG
1609	UGCGGUAC	CUGAUGA	X	GAA	AGUCAGGA	UCCUGACUU	GUACCGCA
1612	AUAUGCGG	CUGAUGA	X	GAA	ACAAGUCA	UGACUUGUA	CCGCAUAU
1619	GGAUACCA	CUGAUGA	X	GAA	AUGCGGUA	UACCGCAUA	UGGUAUCC
1624	UUGAGGGA	CUGAUGA	X	GAA	ACCAUAUG	CAUAUGGUA	UCCCUCAA
1626	GGUUGAGG	CUGAUGA	X	GAA	AUACCAUA	UAUGGUAUC	CCUCAACC
1630	UGUAGGUU	CUGAUGA	X	GAA	AGGGAUAC	GUAUCCCUC	AACCUACA
1636	CUUGAUUG	CUGAUGA	X	GAA	AGGUUGAG	CUCAACCUA	CAAUCAAG
1641	AACCACUU	CUGAUGA	X	GAA	AUUGUAGG	CCUACAAUC	AAGUGGUU
1649	GGUGCCAG	CUGAUGA	X	GAA	ACCACUUG	CAAGUGGUU	CUGGCACC
1650	GGGUGCCA	CUGAUGA	X	GAA	AACCACUU	AAGUGGUUC	UGGCACCC
1663	AUUAUGGU	CUGAUGA	X	GAA	ACAGGGGU	ACCCCUGUA	ACCAUAAU
1669	GGAAUGAU	CUGAUGA	X	GAA	AUGGUUAC	GUAACCAUA	AUCAUUCC
1672	UUCGGAAU	CUGAUGA	X	GAA	AUUAUGGU	ACCAUAAUC	AUUCCGAA
1675	UGCUUCGG	CUGAUGA	X	GAA	AUGAUUAU	AUAAUCAUU	CCGAAGCA
1676	UUGCUUCG	CUGAUGA	X	GAA	AAUGAUUA	UAAUCAUUC	CGAAGCAA
1694	UGGAACAA	CUGAUGA	X	GAA	AGUCACAC	GUGUGACUU	UUGUUCCA
1695	UUGGAACA	CUGAUGA	X	GAA	AAGUCACA	UGUGACUUU	UGUUCCAA
1696	AUUGGAAC	CUGAUGA	X	GAA	AAAGUCAC	GUGACUUUU	GUUCCAAU
1699	AUUAUUGG	CUGAUGA	X	GAA	ACAAAAGU	ACUUUUGUU	CCAAUAAU
1700	CAUUAUUG	CUGAUGA	X	GAA	AACAAAAG	CUUUUGUUC	CAAUAAUG
1705	CUCUUCAU	CUGAUGA	X	GAA	AUUGGAAC	GUUCCAAUA	AUGAAGAG

	1715	GGAUAAAG	CUGAUGA	X	GAA	ACUCUUCA	UGAAGAGUC	CUUUAUCC
	1718	CCAGGAUA	CUGAUGA	X	GAA	AGGACUCU	AGAGUCCUU	UAUCCUGG
	1719	UCCAGGAU	CUGAUGA	X	GAA	AAGGACUC	GAGUCCUUU	AUCCUGGA
	1720	AUCCAGGA	CUGAUGA	X	GAA	AAAGGACU	AGUCCUUUA	UCCUGGAU
5	1722	GCAUCCAG	CUGAUGA	X	GAA	AUAAAGGA	UCCUUUAUC	CUGGAUGC
	1755	AUGCUCUC	CUGAUGA	X	GAA	AUUCUGUU	AACAGAAUU	GAGAGCAU
	1764	CGCUGAGU	CUGAUGA	X	GAA	AUGCUCUC	GAGAGCAUC	ACUCAGCG
	1768	CAUGCGCU	CUGAUGA	X	GAA	AGUGAUGC	GCAUCACUC	AGCGCAUG
	1782	CCUUCUAU	CUGAUGA	X	GAA	AUUGCCAU	AUGGCAAUA	AUAGAAGG
10	1785	UUUCCUUC	CUGAUGA	X	GAA	AUUAUUGC	GCAAUAAUA	GAAGGAAA
	1798	AGCCAUCU	CUGAUGA	X	GAA	AUUCUUUC	GAAAGAAUA	AGAUGGCU
	1807	CAAGGUGC	CUGAUGA	X	GAA	AGCCAUCU	AGAUGGCUA	GCACCUUG
	1814	CCACAACC	CUGAUGA	X	GAA	AGGUGCUA	UAGCACCUU	GGUUGUGG
	1818	UCAGCCAC	CUGAUGA	X	GAA	ACCAAGGU	ACCUUGGUU	GUGGCUGA
15	1829	AAAUUCUA	CUGAUGA	X	GAA	AGUCAGCC	GGCUGACUC	UAGAAUUU
	1831	AGAAAUUC	CUGAUGA	X	GAA	AGAGUCAG	CUGACUCUA	GAAUUUCU
	1836	AUUCCAGA	CUGAUGA	X	GAA	AUUCUAGA	UCUAGAAUU	UCUGGAAU
	1837	GAUUCCAG	CUGAUGA	X	GAA	AAUUCUAG	CUAGAAUUU	CUGGAAUC
	1838	AGAUUCCA	CUGAUGA	X	GAA	AAAUUCUA	UAGAAUUUC	UGGAAUCU
20	1845	CAAAUGUA	CUGAUGA	X	GAA	AUUCCAGA	UCUGGAAUC	UACAUUUG
	1847	UGCAAAUG	CUGAUGA	X	GAA	AGAUUCCA	UGGAAUCUA	CAUUUGCA
	1851	GCUAUGCA	CUGAUGA	X	GAA	AUGUAGAU	AUCUACAUU	UGCAUAGC
	1852	AGCUAUGC	CUGAUGA	X	GAA	AAUGUAGA	UCUACAUUU	GCAUAGCU
	1857	UUGGAAGC	CUGAUGA	X	GAA	AUGCAAAU	AUUUGCAUA	GCUUCCAA
25	1861	UUUAUUGG	CUGAUGA	X	GAA	AGCUAUGC	GCAUAGCUU	CCAAUAAA
	1862	CUUUAUUG	CUGAUGA	X	GAA	AAGCUAUG	CAUAGCUUC	CAAUAAAG
	1867	CCCAACUU	CUGAUGA	X	GAA	AUUGGAAG	CUUCCAAUA	AAGUUGGG
	1872	ACAGUCCC	CUGAUGA	X	GAA	ACUUUAUU	AAUAAAGUU	GGGACUGU
	1893	UAAAAGCU	CUGAUGA	X	GAA	AUGUUUCU	AGAAACAUA	AGCUUUUA
30	1898	UGAUAUAA	CUGAUGA	X	GAA	AGCUUAUG	CAUAAGCUU	UUAUAUCA
	1899	GUGAUAUA	CUGAUGA	X	GAA	AAGCUUAU	AUAAGCUUU	UAUAUCAC
	1900	UGUGAUAU	CUGAUGA	X	GAA	AAAGCUUA	UAAGCUUUU	AUAUCACA
	1901	CUGUGAUA	CUGAUGA	X	GAA	AAAAGCUU	AAGCUUUUA	UAUCACAG

	1903	AUCUGUGA	CUGAUGA	X	GAA	AUAAAAGC	GCUUUUAUA	UCACAGAU
	1905	ACAUCUGU	CUGAUGA	X	GAA	AUAUAAAA	UUUUAUAUC	ACAGAUGU
	1925	UAACAUGA	CUGAUGA	X	GAA	ACCCAUUU	AAAUGGGUU	UCAUGUUA
	1926	UUAACAUG	CUGAUGA	X	GAA	AACCCAUU	AAUGGGUUU	CAUGUUAA
5	1927	GUUAACAU	CUGAUGA	X	GAA	AAACCCAU	AUGGGUUUC	AUGUUAAC
	1932	UCCAAGUU	CUGAUGA	X	GAA	ACAUGAAA	UUUCAUGUU	AACUUGGA
	1933	UUCCAAGU	CUGAUGA	X	GAA	AACAUGAA	UUCAUGUUA	ACUUGGAA
	1937	UUUUUUCC	CUGAUGA	X	GAA	AGUUAACA	UGUUAACUU	GGAAAAAA
	1976	CUGUGCAA	CUGAUGA	X	GAA	ACAGUUUC	GAAACUGUC	UUGCACAG
10	1978	AACUGUGC	CUGAUGA	X	GAA	AGACAGUU	AACUGUCUU	GCACAGUU
	1986	AACUUGUU	CUGAUGA	X	GAA	ACUGUGCA	UGCACAGUU	AACAAGUU
	1987	GAACUUGU	CUGAUGA	X	GAA	AACUGUGC	GCACAGUUA	ACAAGUUC
	1994	UGUAUAAG	CUGAUGA	X	GAA	ACUUGUUA	UAACAAGUU	CUUAUACA
	1995	CUGUAUAA	CUGAUGA	X	GAA	AACUUGUU	AACAAGUUC	UUAUACAG
15	1997	CUCUGUAU	CUGAUGA	X	GAA	AGAACUUG	CAAGUUCUU	AUACAGAG
	1998	UCUCUGUA	CUGAUGA	X	GAA	AAGAACUU	AAGUUCUUA	UACAGAGA
	2000	CGUCUCUG	CUGAUGA	X	GAA	AUAAGAAC	GUUCUUAUA	CAGAGACG
	2010	AUCCAAGU	CUGAUGA	X	GAA	ACGUCUCU	AGAGACGUU	ACUUGGAU
	2011	AAUCCAAG	CUGAUGA	X	GAA	AACGUCUC	GAGACGUUA	CUUGGAUU
20	2014	UAAAAUCC	CUGAUGA	X	GAA	AGUAACGU	ACGUUACUU	GGAUUUUA
	2019	CGCAGUAA	CUGAUGA	X	GAA	AUCCAAGU	ACUUGGAUU	UUACUGCG
	2020	CCGCAGUA	CUGAUGA	X	GAA	AAUCCAAG	CUUGGAUUU	UACUGCGG
	2021	UCCGCAGU	CUGAUGA	X	GAA	AAAUCCAA	UUGGAUUUU	ACUGCGGA
	2022	GUCCGCAG	CUGAUGA	X	GAA	AAAAUCCA	UGGAUUUUA	CUGCGGAC
25	2034	CUGUUAUU	CUGAUGA	X	GAA	ACUGUCCG	CGGACAGUU	AAUAACAG
	2035	UCUGUUAU	CUGAUGA	X	GAA	AACUGUCC	GGACAGUUA	AUAACAGA
	2038	UGUUCUGU	CUGAUGA	X	GAA	AUUAACUG	CAGUUAAUA	ACAGAACA
	2054	UAAUACUG	CUGAUGA	X	GAA	AGUGCAUU	AAUGCACUA	CAGUAUUA
	2059	CUUGCUAA	CUGAUGA	X	GAA	ACUGUAGU	ACUACAGUA	UUAGCAAG
30	2061	UGCUUGCU	CUGAUGA	X	GAA	AUACUGUA	UACAGUAUU	AGCAAGCA
	2062	UUGCUUGC	CUGAUGA	X	GAA	AAUACUGU	ACAGUAUUA	GCAAGCAA
	2082	UCCUUAGU	CUGAUGA	X	GAA	AUGGCCAU	AUGGCCAUC	ACUAAGGA
	2086	GUGCUCCU	CUGAUGA	X	GAA	AGUGAUGG	CCAUCACUA	AGGAGCAC

	2096	GAGUGAUG	CUGAUGA	X	GAA	AGUGCUCC	GGAGCACUC	CAUCACUC
	2100	UUAAGAGU	CUGAUGA	X	GAA	AUGGAGUG	CACUCCAUC	ACUCUUAA
	2104	AAGAUUAA	CUGAUGA	X	GAA	AGUGAUGG	CCAUCACUC	UUAAUCUU
	2106	GUAAGAUU	CUGAUGA	X	GAA	AGAGUGAU	AUCACUCUU	AAUCUUAC
5	2107	GGUAAGAU	CUGAUGA	X	GAA	AAGAGUGA	UCACUCUUA	AUCUUACC
	2110	GAUGGUAA	CUGAUGA	X	GAA	AUUAAGAG	CUCUUAAUC	UUACCAUC
	2112	AUGAUGGU	CUGAUGA	X	GAA	AGAUUAAG	CUUAAUCUU	ACCAUCAU
	2113	CAUGAUGG	CUGAUGA	X	GAA	AAGAUUAA	UUAAUCUUA	CCAUCAUG
	2118	ACAUUCAU	CUGAUGA	X	GAA	AUGGUAAG	CUUACCAUC	AUGAAUGU
10	2127	UGCAGGGA	CUGAUGA	X	GAA	ACAUUCAU	AUGAAUGUU	UCCCUGCA
	2128	UUGCAGGG	CUGAUGA	X	GAA	AACAUUCA	UGAAUGUUU	CCCUGCAA
	2129	CUUGCAGG	CUGAUGA	X	GAA	AAACAUUC	GAAUGUUUC	CCUGCAAG
	2140	GGUGCCUG	CUGAUGA	X	GAA	AUCUUGCA	UGCAAGAUU	CAGGCACC
	2141	AGGUGCCU	CUGAUGA	X	GAA	AAUCUUGC	GCAAGAUUC	AGGCACCU
15	2150	UGCAGGCA	CUGAUGA	X	GAA	AGGUGCCU	AGGCACCUA	UGCCUGCA
	2172	CCUGUGUA	CUGAUGA	X	GAA	ACAUUCCU	AGGAAUGUA	UACACAGG
	2174	CCCCUGUG	CUGAUGA	X	GAA	AUACAUUC	GAAUGUAUA	CACAGGGG
	2190	UUCUGGAG	CUGAUGA	X	GAA	AUUUCUUC	GAAGAAAUC	CUCCAGAA
	2193	UUCUUCUG	CUGAUGA	X	GAA	AGGAUUUC	GAAAUCCUC	CAGAAGAA
20	2208	CUGAUUGU	CUGAUGA	X	GAA	AUUUCUUU	AAAGAAAUU	ACAAUCAG
	2209	UCUGAUUG	CUGAUGA	X	GAA	AAUUUCUU	AAGAAAUUA	CAAUCAGA
	2214	UGAUCUCU	CUGAUGA	X	GAA	AUUGUAAU	AUUACAAUC	AGAGAUCA
	2221	UGCUUCCU	CUGAUGA	X	GAA	AUCUCUGA	UCAGAGAUC	AGGAAGCA
	2234	GCAGGAGG	CUGAUGA	X	GAA	AUGGUGCU	AGCACCAUA	CCUCCUGC
25	2238	UUUCGCAG	CUGAUGA	X	GAA	AGGUAUGG	CCAUACCUC	CUGCGAAA
	2250	UGAUCACU	CUGAUGA	X	GAA	AGGUUUCG	CGAAACCUC	AGUGAUCA
	2257	CACUGUGU	CUGAUGA	X	GAA	AUCACUGA	UCAGUGAUC	ACACAGUG
	2271	GAACUGCU	CUGAUGA	X	GAA	AUGGCCAC	GUGGCCAUC	AGCAGUUC
	2278	AGUGGUGG	CUGAUGA	X	GAA	ACUGCUGA	UCAGCAGUU	CCACCACU
30	2279	AAGUGGUG	CUGAUGA	X	GAA	AACUGCUG	CAGCAGUUC	CACCACUU
	2287	ACAGUCUA	CUGAUGA	X	GAA	AGUGGUGG	CCACCACUU	UAGACUGU
	2288	GACAGUCU	CUGAUGA	X	GAA	AAGUGGUG	CACCACUUU	AGACUGUC
	2289	UGACAGUC	CUGAUGA	X	GAA	AAAGUGGU	ACCACUUUA	GACUGUCA

	2296	AUUAGCAU	CUGAUGA	X	GAA	ACAGUCUA	UAGACUGUC	AUGCUAAU
	2302	GACACCAU	CUGAUGA	X	GAA	AGCAUGAC	GUCAUGCUA	AUGGUGUC
	2310	GGCUCGGG	CUGAUGA	X	GAA	ACACCAUU	AAUGGUGUC	CCCGAGCC
	2320	AGUGAUCU	CUGAUGA	X	GAA	AGGCUCGG	CCGAGCCUC	AGAUCACU
5	2325	AACCAAGU	CUGAUGA	X	GAA	AUCUGAGG	CCUCAGAUC	ACUUGGUU
	2329	UUUAAACC	CUGAUGA	X	GAA	AGUGAUCU	AGAUCACUU	GGUUUAAA
	2333	UGUUUUUA	CUGAUGA	X	GAA	ACCAAGUG	CACUUGGUU	UAAAAACA
	2334	UUGUUUUU	CUGAUGA	X	GAA	AACCAAGU	ACUUGGUUU	AAAAACAA
	2335	GUUGUUUU	CUGAUGA	X	GAA	AAACCAAG	CUUGGUUUA	AAAACAAC
10	2352	UCUUGUUG	CUGAUGA	X	GAA	AUUUUGUG	CACAAAAUA	CAACAAGA
	2370	CCUAAAAU	CUGAUGA	X	GAA	AUUCCAGG	CCUGGAAUU	AUUUUAGG
	2371	UCCUAAAA	CUGAUGA	X	GAA	AAUUCCAG	CUGGAAUUA	UUUUAGGA
	2373	GGUCCUAA	CUGAUGA	X	GAA	AUAAUUCC	GGAAUUAUU	UUAGGACC
	2374	UGGUCCUA	CUGAUGA	X	GAA	AAUAAUUC	GAAUUAUUU	UAGGACCA
15	2375	CUGGUCCU	CUGAUGA	X	GAA	AAAUAAUU	AAUUAUUUU	AGGACCAG
	2376	CCUGGUCC	CUGAUGA	X	GAA	AAAAUAAU	AUUAUUUUA	GGACCAGG
	2399	UUUCAAUA	CUGAUGA	X	GAA	ACAGCGUG	CACGCUGUU	UAUUGAAA
	2400	CUUUCAAU	CUGAUGA	X	GAA	AACAGCGU	ACGCUGUUU	AUUGAAAG
	2401	UCUUUCAA	CUGAUGA	X	GAA	AAACAGCG	CGCUGUUUA	UUGAAAGA
20	2403	ACUCUUUC	CUGAUGA	X	GAA	AUAAACAG	CUGUUUAUU	GAAAGAGU
	2412	UCUUCUGU	CUGAUGA	X	GAA	ACUCUUUC	GAAAGAGUC	ACAGAAGA
	2433	CAGUGAUA	CUGAUGA	X	GAA	ACACCUUC	GAAGGUGUC	UAUCACUG
	2435	UGCAGUGA	CUGAUGA	X	GAA	AGACACCU	AGGUGUCUA	UCACUGCA
	2437	UUUGCAGU	CUGAUGA	X	GAA	AUAGACAC	GUGUCUAUC	ACUGCAAA
25	2465	UUUCCACA	CUGAUGA	X	GAA	AGCCCUUC	GAAGGGCUC	UGUGGAAA
	2476	GUAUGCUG	CUGAUGA	X	GAA	ACUUUCCA	UGGAAAGUU	CAGCAUAC
	2477	GGUAUGCU	CUGAUGA	X	GAA	AACUUUCC	GGAAAGUUC	AGCAUACC
	2483	CAGUGAGG	CUGAUGA	X	GAA	AUGCUGAA	UUCAGCAUA	CCUCACUG
	2487	UGAACAGU	CUGAUGA	X	GAA	AGGUAUGC	GCAUACCUC	ACUGUUCA
30	2493	GUUCCUUG	CUGAUGA	X	GAA	ACAGUGAG	CUCACUGUU	CAAGGAAC
	2494	GGUUCCUU	CUGAUGA	X	GAA	AACAGUGA	UCACUGUUC	AAGGAACC
	2504	ACUUGUCC	CUGAUGA	X	GAA	AGGUUCCU	AGGAACCUC	GGACAAGU
	2513	CCAGAUUA	CUGAUGA	X	GAA	ACUUGUCC	GGACAAGUC	UAAUCUGG

2515	CUCCAGAU CUGAUGA X GAA	AGACUUGU	ACAAGUCUA AUCUGGAG
2518	CAGCUCCA CUGAUGA X GAA	AUUAGACU	AGUCUAAUC UGGAGCUG
2529	GUUAGAGU CUGAUGA X GAA	AUCAGCUC	GAGCUGAUC ACUCUAAC
2533	GCAUGUUA CUGAUGA X GAA	AGUGAUCA	UGAUCACUC UAACAUGC
2535	GUGCAUGU CUGAUGA X GAA	AGAGUGAU	AUCACUCUA ACAUGCAC
2560	CCAGAAGA CUGAUGA X GAA	AGUCGCAG	CUGCGACUC UCUUCUGG
2562	AGCCAGAA CUGAUGA X GAA	AGAGUCGC	GCGACUCUC UUCUGGCU
2564	GGAGCCAG CUGAUGA X GAA	AGAGAGUC	GACUCUCUU CUGGCUCC
2565	AGGAGCCA CUGAUGA X GAA	AAGAGAGU	ACUCUCUUC UGGCUCCU
2571	GUUAAUAG CUGAUGA X GAA	AGCCAGAA	UUCUGGCUC CUAUUAAC
2574	AGGGUUAA CUGAUGA X GAA	AGGAGCCA	UGGCUCCUA UUAACCCU
2576	GGAGGGUU CUGAUGA X GAA	AUAGGAGC	GCUCCUAUU AACCCUCC
2577	AGGAGGGU CUGAUGA X GAA	AAUAGGAG	CUCCUAUUA ACCCUCCU
2583	CGGAUAAG CUGAUGA X GAA	AGGGUUAA	UUAACCCUC CUUAUCCG
2586	UUUCGGAU CUGAUGA X GAA	AGGAGGGU	ACCCUCCUU AUCCGAAA
2587	UUUUCGGA CUGAUGA X GAA	AAGGAGGG	CCCUCCUUA UCCGAAAA
2589	AUUUUUCG CUGAUGA X GAA	AUAAGGAG	CUCCUUAUC CGAAAAAU
2606	CAGAAGAA CUGAUGA X GAA	ACCUUUUC	GAAAAGGUC UUCUUCUG
2608	UUCAGAAG CUGAUGA X GAA	AGACCUUU	AAAGGUCUU CUUCUGAA
2609	UUUCAGAA CUGAUGA X GAA	AAGACCUU	AAGGUCUUC UUCUGAAA
2611	UAUUUCAG CUGAUGA X GAA	AGAAGACC	GGUCUUCUU CUGAAAUA
2612	UUAUUUCA CUGAUGA X GAA	AAGAAGAC	GUCUUCUUC UGAAAUAA
2619	UCAGUCUU CUGAUGA X GAA	AUUUCAGA	UCUGAAAUA AAGACUGA
2630	UUGAUAGG CUGAUGA X GAA	AGUCAGUC	GACUGACUA CCUAUCAA
2634	AUAAUUGA CUGAUGA X GAA	AGGUAGUC	GACUACCUA UCAAUUAU
2636	UUAUAAUU CUGAUGA X GAA	AUAGGUAG	CUACCUAUC AAUUAUAA
2640	UCCAUUAU CUGAUGA X GAA	AUUGAUAG	CUAUCAAUU AUAAUGGA
2641	GUCCAUUA CUGAUGA X GAA	AAUUGAUA	UAUCAAUUA UAAUGGAC
2643	GGGUCCAU CUGAUGA X GAA	AUAAUUGA	UCAAUUAUA AUGGACCC
2661	UCCAAAGG CUGAUGA X GAA	ACUUCAUC	GAUGAAGUU CCUUUGGA
2662	AUCCAAAG CUGAUGA X GAA	AACUUCAU	AUGAAGUUC CUUUGGAU
2665	CUCAUCCA CUGAUGA X GAA	AGGAACUU	AAGUUCCUU UGGAUGAG
2666	GCUCAUCC CUGAUGA X GAA	AAGGAACU	AGUUCCUUU GGAUGAGC

2688	UCAUAAGG CUGAUGA X GAA	AGCCGCUC	GAGCGGCUC CCUUAUGA
2692	GGCAUCAU CUGAUGA X GAA	AGGGAGCC	GGCUCCCUU AUGAUGCC
2693	UGGCAUCA CUGAUGA X GAA	AAGGGAGC	GCUCCCUUA UGAUGCCA
2714	CCCGGGCA CUGAUGA X GAA	ACUCCCAC	GUGGGAGUU UGCCCGGG
2715	UCCCGGGC CUGAUGA X GAA	AACUCCCA	UGGGAGUUU GCCCGGGA
2730	CCCAGUUU CUGAUGA X GAA	AGUCUCUC	GAGAGACUU AAACUGGG
2731	GCCCAGUU CUGAUGA X GAA	AAGUCUCU	AGAGACUUA AACUGGGC
2744	UUCCAAGU CUGAUGA X GAA	AUUUGCCC	GGGCAAAUC ACUUGGAA
2748	CCUCUUCC CUGAUGA X GAA	AGUGAUUU	AAAUCACUU GGAAGAGG
2761	UUUUCCAA CUGAUGA X GAA	AGCCCCUC	GAGGGGCUU UUGGAAAA
2762	CUUUUCCA CUGAUGA X GAA	AAGCCCCU	AGGGGCUUU UGGAAAAG
2763	ACUUUUCC CUGAUGA X GAA	AAAGCCCC	GGGGCUUUU GGAAAAGU
2775	GAUGCUUG CUGAUGA X GAA	ACCACUUU	AAAGUGGUU CAAGCAUC
2776	UGAUGCUU CUGAUGA X GAA	AACCACUU	AAGUGGUUC AAGCAUCA
2783	CAAAUGCU CUGAUGA X GAA	AUGCUUGA	UCAAGCAUC AGCAUUUG
2789	UAAUGCCA CUGAUGA X GAA	AUGCUGAU	AUCAGCAUU UGGCAUUA
2790	UUAAUGCC CUGAUGA X GAA	AAUGCUGA	UCAGCAUUU GGCAUUAA
2796	GAUUUCUU CUGAUGA X GAA	AUGCCAAA	UUUGGCAUU AAGAAAUC
2797	UGAUUUCU CUGAUGA X GAA	AAUGCCAA	UUGGCAUUA AGAAAUCA
2804	ACGUAGGU CUGAUGA X GAA	AUUUCUUA	UAAGAAAUC ACCUACGU
2809	CCGGCACG CUGAUGA X GAA	AGGUGAUU	AAUCACCUA CGUGCCGG
2864	GAGCUUUG CUGAUGA X GAA	ACUCGCUG	CAGCGAGUA CAAAGCUC
2872	AGUCAUCA CUGAUGA X GAA	AGCUUUGU	ACAAAGCUC UGAUGACU
2886	AAGAUUUU CUGAUGA X GAA	AGCUCAGU	ACUGAGCUA AAAAUCUU
2892	UGGGUCAA CUGAUGA X GAA	AUUUUUAG	CUAAAAAUC UUGACCCA
2894	UGUGGGUC CUGAUGA X GAA	AGAUUUUU	AAAAAUCUU GACCCACA
2904	UGGUGGCC CUGAUGA X GAA	AUGUGGGU	ACCCACAUU GGCCACCA
2914	CACGUUCA CUGAUGA X GAA	AUGGUGGC	GCCACCAUC UGAACGUG
2925	AGCAGGUU CUGAUGA X GAA	ACCACGUU	AACGUGGUU AACCUGCU
2926	CAGCAGGU CUGAUGA X GAA	AACCACGU	ACGUGGUUA ACCUGCUG
2962	CACCAUCA CUGAUGA X GAA	AGGCCCUC	GAGGGCCUC UGAUGGUG
2973	UAUUCAAC CUGAUGA X GAA	AUCACCAU	AUGGUGAUU GUUGAAUA
2976	CAGUAUUC CUGAUGA X GAA	ACAAUCAC	GUGAUUGUU GAAUACUG

	2981	AUUUGCAG	CUGAUGA	X	GAA	AUUCAACA	UGUUGAAUA	CUGCAAAU
	2990	GAUUUCCA	CUGAUGA	X	GAA	AUUUGCAG	CUGCAAAUA	UGGAAAUC
	2998	GUUGGAGA	CUGAUGA	X	GAA	AUUUCCAU	AUGGAAAUC	UCUCCAAC
	3000	UAGUUGGA	CUGAUGA	X	GAA	AGAUUUCC	GGAAAUCUC	UCCAACUA
5	3002	GGUAGUUG	CUGAUGA	X	GAA	AGAGAUUU	AAAUCUCUC	CAACUACC
	3008	UCUUGAGG	CUGAUGA	X	GAA	AGUUGGAG	CUCCAACUA	CCUCAAGA
	3012	UUGCUCUU	CUGAUGA	X	GAA	AGGUAGUU	AACUACCUC	AAGAGCAA
	3029	GAAAAAAU	CUGAUGA	X	GAA	AGUCACGU	ACGUGACUU	AUUUUUUC
	3030	AGAAAAAA	CUGAUGA	X	GAA	AAGUCACG	CGUGACUUA	UUUUUUCU
10	3032	UGAGAAAA	CUGAUGA	X	GAA	AUAAGUCA	UGACUUAUU	UUUUCUCA
	3033	UUGAGAAA	CUGAUGA	X	GAA	AAUAAGUC	GACUUAUUU	UUUCUCAA
	3034	GUUGAGAA	CUGAUGA	X	GAA	AAAUAAGU	ACUUAUUUU	UUCUCAAC
	3035	UGUUGAGA	CUGAUGA	X	GAA	AAAAUAAG	CUUAUUUUU	UCUCAACA
	3036	UUGUUGAG	CUGAUGA	X	GAA	AAAAAUAA	UUAUUUUUU	CUCAACAA
15	3037	CUUGUUGA	CUGAUGA	X	GAA	AAAAAAUA	UAUUUUUUC	UCAACAAG
	3039	UCCUUGUU	CUGAUGA	X	GAA	AGAAAAAA	UUUUUUCUC	AACAAGGA
	3057	UCCAUGUG	CUGAUGA	X	GAA	AGUGCUGC	GCAGCACUA	CACAUGGA
	3070	UUCUUUCU	CUGAUGA	X	GAA	AGGCUCCA	UGGAGCCUA	AGAAAGAA
	3120	ACGCUAUC	CUGAUGA	X	GAA	AGUCUUGG	CCAAGACUA	GAUAGCGU
20	3124	GGUGACGC	CUGAUGA	X	GAA	AUCUAGUC	GACUAGAUA	GCGUCACC
	3129	CUGCUGGU	CUGAUGA	X	GAA	ACGCUAUC	GAUAGCGUC	ACCAGCAG
	3146	AGCUCGCA	CUGAUGA	X	GAA	AGCUUUCG	CGAAAGCUU	UGCGAGCU
	3147	GAGCUCGC	CUGAUGA	X	GAA	AAGCUUUC	GAAAGCUUU	GCGAGCUC
	3155	GAAAGCCG	CUGAUGA	X	GAA	AGCUCGCA	UGCGAGCUC	CGGCUUUC
25	3161	CUUCCUGA	CUGAUGA	X	GAA	AGCCGGAG	CUCCGGCUU	UCAGGAAG
	3162	UCUUCCUG	CUGAUGA	X	GAA	AAGCCGGA	UCCGGCUUU	CAGGAAGA
	3163	AUCUUCCU	CUGAUGA	X	GAA	AAAGCCGG	CCGGCUUUC	AGGAAGAU
	3172	CAGACUUU	CUGAUGA	X	GAA	AUCUUCCU	AGGAAGAUA	AAAGUCUG
	3178	AUCACUCA	CUGAUGA	X	GAA	ACUUUUAU	AUAAAAGUC	UGAGUGAU
30	3189	UCUUCCUC	CUGAUGA	X	GAA	ACAUCACU	AGUGAUGUU	GAGGAAGA
	3205	ACCGUCAG	CUGAUGA	X	GAA	AUCCUCCU	AGGAGGAUU	CUGACGGU
	3206	AACCGUCA	CUGAUGA	X	GAA	AAUCCUCC	GGAGGAUUC	UGACGGUU
	3214	CUUGUAGA	CUGAUGA	X	GAA	ACCGUCAG	CUGACGGUU	UCUACAAG

	3215	CCUUGUAG	CUGAUGA	X	GAA	AACCGUCA	UGACGGUUU	CUACAAGG
	3216	UCCUUGUA	CUGAUGA	X	GAA	AAACCGUC	GACGGUUUC	UACAAGGA
	3218	GCUCCUUG	CUGAUGA	X	GAA	AGAAACCG	CGGUUUCUA	CAAGGAGC
	3231	UCCAUAGU	CUGAUGA	X	GAA	AUGGGCUC	GAGCCCAUC	ACUAUGGA
5	3235	AUCUUCCA	CUGAUGA	X	GAA	AGUGAUGG	CCAUCACUA	UGGAAGAU
	3244	AGAAAUCA	CUGAUGA	X	GAA	AUCUUCCA	UGGAAGAUC	UGAUUUCU
	3249	CUGUAAGA	CUGAUGA	X	GAA	AUCAGAUC	GAUCUGAUU	UCUUACAG
	3250	ACUGUAAG	CUGAUGA	X	GAA	AAUCAGAU	AUCUGAUUU	CUUACAGU
	3251	AACUGUAA	CUGAUGA	X	GAA	AAAUCAGA	UCUGAUUUC	UUACAGUU
10	3253	AAAACUGU	CUGAUGA	X	GAA	AGAAAUCA	UGAUUUCUU	ACAGUUUU
	3254	GAAAACUG	CUGAUGA	X	GAA	AAGAAAUC	GAUUUCUUA	CAGUUUUC
	3259	CACUUGAA	CUGAUGA	X	GAA	ACUGUAAG	CUUACAGUU	UUCAAGUG
	3260	CCACUUGA	CUGAUGA	X	GAA	AACUGUAA	UUACAGUUU	UCAAGUGG
	3261	GCCACUUG	CUGAUGA	X	GAA	AAACUGUA	UACAGUUUU	CAAGUGGC
15	3262	GGCCACUU	CUGAUGA	X	GAA	AAAACUGU	ACAGUUUUC	AAGUGGCC
	3284	AAGACAGG	CUGAUGA	X	GAA	ACUCCAUG	CAUGGAGUU	CCUGUCUU
	3285	GAAGACAG	CUGAUGA	X	GAA	AACUCCAU	AUGGAGUUC	CUGUCUUC
	3290	UUCUGGAA	CUGAUGA	X	GAA	ACAGGAAC	GUUCCUGUC	UUCCAGAA
	3292	CUUUCUGG	CUGAUGA	X	GAA	AGACAGGA	UCCUGUCUU	CCAGAAAG
20	3293	ACUUUCUG	CUGAUGA	X	GAA	AAGACAGG	CCUGUCUUC	CAGAAAGU
	3306	UCCCGAUG	CUGAUGA	X	GAA	AUGCACUU	AAGUGCAUU	CAUCGGGA
	3307	GUCCCGAU	CUGAUGA	X	GAA	AAUGCACU	AGUGCAUUC	AUCGGGAC
	3310	CAGGUCCC	CUGAUGA	X	GAA	AUGAAUGC	GCAUUCAUC	GGGACCUG
	3333	GAUAAAAG	CUGAUGA	X	GAA	AUGUUUCU	AGAAACAUU	CUUUUAUC
25	3334	AGAUAAAA	CUGAUGA	X	GAA	AAUGUUUC	GAAACAUUC	UUUUAUCU
	3336	UCAGAUAA	CUGAUGA	X	GAA	AGAAUGUU	AACAUUCUU	UUAUCUGA
	3337	CUCAGAUA	CUGAUGA	X	GAA	AAGAAUGU	ACAUUCUUU	UAUCUGAG
	3338	UCUCAGAU	CUGAUGA	X	GAA	AAAGAAUG	CAUUCUUUU	AUCUGAGA
	3339	UUCUCAGA	CUGAUGA	X	GAA	AAAAGAAU	AUUCUUUUA	UCUGAGAA
30	3341	UGUUCUCA	CUGAUGA	X	GAA	AUAAAAGA	UCUUUUAUC	UGAGAACA
	3363	AAAUCACA	CUGAUGA	X	GAA	AUCUUCAC	GUGAAGAUU	UGUGAUUU
	3364	AAAAUCAC	CUGAUGA	X	GAA	AAUCUUCA	UGAAGAUUU	GUGAUUUU
	3370	AAGGCCAA	CUGAUGA	X	GAA	AUCACAAA	UUUGUGAUU	UUGGCCUU

	3371	CAAGGCCA	CUGAUGA	X	GAA	AAUCACAA	UUGUGAUUU UGGCCUUG
	3372	GCAAGGCC	CUGAUGA	X	GAA	AAAUCACA	UGUGAUUUU GGCCUUGC
	3378	UCCCGGGC	CUGAUGA	X	GAA	AGGCCAAA	UUUGGCCUU GCCCGGGA
	3388	CUUAUAAA	CUGAUGA	X	GAA	AUCCCGGG	CCCGGGAUA UUUAUAAG
5	3390	UUCUUAUA	CUGAUGA	X	GAA	AUAUCCCG	CGGGAUAUU UAUAAGAA
	3391	GUUCUUAU	CUGAUGA	X	GAA	AAUAUCCC	GGGAUAUUU AUAAGAAC
	3392	GGUUCUUA	CUGAUGA	X	GAA	AAAUAUCC	GGAUAUUUA UAAGAACC
	3394	GGGGUUCU	CUGAUGA	X	GAA	AUAAAUAU	AUAUUUAUA AGAACCCC
	3406	UCUCACAU	CUGAUGA	X	GAA	AUCGGGGU	ACCCCGAUU AUGUGAGA
10	3407	UUCUCACA	CUGAUGA	X	GAA	AAUCGGGG	CCCCGAUUA UGUGAGAA
	3424	AAGUCGAG	CUGAUGA	X	GAA	AUCUCCUU	AAGGAGAUA CUCGACUU
	3427	AGGAAGUC	CUGAUGA	X	GAA	AGUAUCUC	GAGAUACUC GACUUCCU
	3432	UUCAGAGG	CUGAUGA	X	GAA	AGUCGAGU	ACUCGACUU CCUCUGAA
	3433	UUUCAGAG	CUGAUGA	X	GAA	AAGUCGAG	CUCGACUUC CUCUGAAA
15	3436	CCAUUUCA	CUGAUGA	X	GAA	AGGAAGUC	GACUUCCUC UGAAAUGG
	3451	AGAUUCGG	CUGAUGA	X	GAA	AGCCAUCC	GGAUGGCUC CCGAAUCU
	3458	CAAAGAUA	CUGAUGA	X	GAA	AUUCGGGA	UCCCGAAUC UAUCUUUG
	3460	GUCAAAGA	CUGAUGA	X	GAA	AGAUUCGG	CCGAAUCUA UCUUUGAC
	3462	UUGUCAAA	CUGAUGA	X	GAA	AUAGAUUC	GAAUCUAUC UUUGACAA
20	3464	UUUUGUCA	CUGAUGA	X	GAA	AGAUAGAU	AUCUAUCUU UGACAAAA
	3465	AUUUUGUC	CUGAUGA	X	GAA	AAGAUAGA	UCUAUCUUU GACAAAAU
	3474	GUGCUGUA	CUGAUGA	X	GAA	AUUUUGUC	GACAAAAUC UACAGCAC
	3476	UGGUGCUG	CUGAUGA	X	GAA	AGAUUUUG	CAAAAUCUA CAGCACCA
	3500	CUCCGUAA	CUGAUGA	X	GAA	ACCACACG	CGUGUGGUC UUACGGAG
25	3502	UACUCCGU	CUGAUGA	X	GAA	AGACCACA	UGUGGUCUU ACGGAGUA
	3503	AUACUCCG	CUGAUGA	X	GAA	AAGACCAC	GUGGUCUUA CGGAGUAU
	3510	CACAGCAA	CUGAUGA	X	GAA	ACUCCGUA	UACGGAGUA UUGCUGUG
	3512	CCCACAGC	CUGAUGA	X	GAA	AUACUCCG	CGGAGUAUU GCUGUGGG
	3525	AAGGAGAA	CUGAUGA	X	GAA	AUUUCCCA	UGGGAAAUC UUCUCCUU
30	3527	CUAAGGAG	CUGAUGA	X	GAA	AGAUUUCC	GGAAAUCUU CUCCUUAG
	3528	CCUAAGGA	CUGAUGA	X	GAA	AAGAUUUC	GAAAUCUUC UCCUUAGG
	3530	CACCUAAG	CUGAUGA	X	GAA	AGAAGAUU	AAUCUUCUC CUUAGGUG
	3533	ACCCACCU	CUGAUGA	X	GAA	AGGAGAAG	CUUCUCCUU AGGUGGGU

	3534	GACCCACC	CUGAUGA	X	GAA	AAGGAGAA	UUCUCCUUA	GGUGGGUC
	3542	GGUAUGGA	CUGAUGA	X	GAA	ACCCACCU	AGGUGGGUC	UCCAUACC
	3544	UGGGUAUG	CUGAUGA	X	GAA	AGACCCAC	GUGGGUCUC	CAUACCCA
	3548	CUCCUGGG	CUGAUGA	X	GAA	AUGGAGAC	GUCUCCAUA	CCCAGGAG
5	3558	UCCAUUUG	CUGAUGA	X	GAA	ACUCCUGG	CCAGGAGUA	CAAAUGGA
	3575	GACUGCAA	CUGAUGA	X	GAA	AGUCCUCA	UGAGGACUU	UUGCAGUC
	3576	CGACUGCA	CUGAUGA	X	GAA	AAGUCCUC	GAGGACUUU	UGCAGUCG
	3577	GCGACUGC	CUGAUGA	X	GAA	AAAGUCCU	AGGACUUUU	GCAGUCGC
	3583	CCUCAGGC	CUGAUGA	X	GAA	ACUGCAAA	UUUGCAGUC	GCCUGAGG
10	3613	GUACUCAG	CUGAUGA	X	GAA	AGCUCUCA	UGAGAGCUC	CUGAGUAC
	3620	GAGUAGAG	CUGAUGA	X	GAA	ACUCAGGA	UCCUGAGUA	CUCUACUC
	3623	CAGGAGUA	CUGAUGA	X	GAA	AGUACUCA	UGAGUACUC	UACUCCUG
	3625	UUCAGGAG	CUGAUGA	X	GAA	AGAGUACU	AGUACUCUA	CUCCUGAA
	3628	GAUUUCAG	CUGAUGA	X	GAA	AGUAGAGU	ACUCUACUC	CUGAAAUC
15	3636	AUCUGAUA	CUGAUGA	X	GAA	AUUUCAGG	CCUGAAAUC	UAUCAGAU
	3638	UGAUCUGA	CUGAUGA	X	GAA	AGAUUUCA	UGAAAUCUA	UCAGAUCA
	3640	CAUGAUCU	CUGAUGA	X	GAA	AUAGAUUU	AAAUCUAUC	AGAUCAUG
	3645	UCCAGCAU	CUGAUGA	X	GAA	AUCUGAUA	UAUCAGAUC	AUGCUGGA
	3689	GUUCUGCA	CUGAUGA	X	GAA	AUCUUGGC	GCCAAGAUU	UGCAGAAC
20	3690	AGUUCUGC	CUGAUGA	X	GAA	AAUCUUGG	CCAAGAUUU	GCAGAACU
	3699	UUUUCCAC	CUGAUGA	X	GAA	AGUUCUGC	GCAGAACUU	GUGGAAAA
	3711	AAAUCACC	CUGAUGA	X	GAA	AGUUUUUC	GAAAAACUA	GGUGAUUU
	3718	UUGAAGCA	CUGAUGA	X	GAA	AUCACCUA	UAGGUGAUU	UGCUUCAA
	3719	CUUGAAGC	CUGAUGA	X	GAA	AAUCACCU	AGGUGAUUU	GCUUCAAG
25	3723	UUUGCUUG	CUGAUGA	X	GAA	AGCAAAUC	GAUUUGCUU	CAAGCAAA
	3724	AUUUGCUU	CUGAUGA	X	GAA	AAGCAAAU	AUUUGCUUC	AAGCAAAU
	3735	UCCUGUUG	CUGAUGA	X	GAA	ACAUUUGC	GCAAAUGUA	CAACAGGA
	3748	GUAGUCUU	CUGAUGA	X	GAA	ACCAUCCU	AGGAUGGUA	AAGACUAC
	3755	UUGGGAUG	CUGAUGA	X	GAA	AGUCUUUA	UAAAGACUA	CAUCCCAA
30	3759	UUGAUUGG	CUGAUGA	X	GAA	AUGUAGUC	GACUACAUC	CCAAUCAA
	3765	AUGGCAUU	CUGAUGA	X	GAA	AUUGGGAU	AUCCCAAUC	AAUGCCAU
	3774	CCUGUCAG	CUGAUGA	X	GAA	AUGGCAUU	AAUGCCAUA	CUGACAGG
	3787	AAACCCAC	CUGAUGA	X	GAA	AUUUCCUG	CAGGAAAUA	GUGGGUUU

	3794	AGUAUGUA	CUGAUGA	X	GAA	ACCCACUA	UAGUGGGUU	UACAUACU
	3795	GAGUAUGU	CUGAUGA	X	GAA	AACCCACU	AGUGGGUUU	ACAUACUC
	3796	UGAGUAUG	CUGAUGA	X	GAA	AAACCCAC	GUGGGUUUA	CAUACUCA
	3800	GAGUUGAG	CUGAUGA	X	GAA	AUGUAAAC	GUUUACAUA	CUCAACUC
5	3803	CAGGAGUU	CUGAUGA	X	GAA	AGUAUGUA	UACAUACUC	AACUCCUG
	3808	GAAGGCAG	CUGAUGA	X	GAA	AGUUGAGU	ACUCAACUC	CUGCCUUC
	3815	CCUCAGAG	CUGAUGA	X	GAA	AGGCAGGA	UCCUGCCUU	CUCUGAGG
	3816	UCCUCAGA	CUGAUGA	X	GAA	AAGGCAGG	CCUGCCUUC	UCUGAGGA
	3818	AGUCCUCA	CUGAUGA	X	GAA	AGAAGGCA	UGCCUUCUC	UGAGGACU
10	3827	CCUUGAAG	CUGAUGA	X	GAA	AGUCCUCA	UGAGGACUU	CUUCAAGG
	3828	UCCUUGAA	CUGAUGA	X	GAA	AAGUCCUC	GAGGACUUC	UUCAAGGA
	3830	UUUCCUUG	CUGAUGA	X	GAA	AGAAGUCC	GGACUUCUU	CAAGGAAA
	3831	CUUUCCUU	CUGAUGA	X	GAA	AAGAAGUC	GACUUCUUC	AAGGAAAG
	3841	AGCUGAAA	CUGAUGA	X	GAA	ACUUUCCU	AGGAAAGUA	UUUCAGCU
15	3843	GGAGCUGA	CUGAUGA	X	GAA	AUACUUUC	GAAAGUAUU	UCAGCUCC
	3844	CGGAGCUG	CUGAUGA	X	GAA	AAUACUUU	AAAGUAUUU	CAGCUCCG
	3845	UCGGAGCU	CUGAUGA	X	GAA	AAAUACUU	AAGUAUUUC	AGCUCCGA
	3850	AAACUUCG	CUGAUGA	X	GAA	AGCUGAAA	UUUCAGCUC	CGAAGUUU
	3857	CUGAAUUA	CUGAUGA	X	GAA	ACUUCGGA	UCCGAAGUU	UAAUUCAG
20	3858	CCUGAAUU	CUGAUGA	X	GAA	AACUUCGG	CCGAAGUUU	AAUUCAGG
	3859	UCCUGAAU	CUGAUGA	X	GAA	AAACUUCG	CGAAGUUUA	AUUCAGGA
	3862	GCUUCCUG	CUGAUGA	X	GAA	AUUAAACU	AGUUUAAUU	CAGGAAGC
	3863	AGCUUCCU	CUGAUGA	X	GAA	AAUUAAAC	GUUUAAUUC	AGGAAGCU
	3872	CAUCAUCA	CUGAUGA	X	GAA	AGCUUCCU	AGGAAGCUC	UGAUGAUG
25	3882	ACAUAUCU	CUGAUGA	X	GAA	ACAUCAUC	GAUGAUGUC	AGAUAUGU
	3887	CAUUUACA	CUGAUGA	X	GAA	AUCUGACA	UGUCAGAUA	UGUAAAUG
	3891	AAAGCAUU	CUGAUGA	X	GAA	ACAUAUCU	AGAUAUGUA	AAUGCUUU
	3898	GAACUUGA	CUGAUGA	X	GAA	AGCAUUUA	UAAAUGCUU	UCAAGUUC
	3899	UGAACUUG	CUGAUGA	X	GAA	AAGCAUUU	AAAUGCUUU	CAAGUUCA
30	3900	AUGAACUU	CUGAUGA	X	GAA	AAAGCAUU	AAUGCUUUC	AAGUUCAU
	3905	GGCUCAUG	CUGAUGA	X	GAA	ACUUGAAA	UUUCAAGUU	CAUGAGCC
	3906	AGGCUCAU	CUGAUGA	X	GAA	AACUUGAA	UUCAAGUUC	AUGAGCCU
	3924	AAGGUUUU	CUGAUGA	X	GAA	AUUCUUUC	GAAAGAAUC	AAAACCUU

3932	GUUCUUCA	CUGAUGA	X	GAA	AGGUUUUG	CAAAACCUU UGAAGAAC
3933	AGUUCUUC	CUGAUGA	X	GAA	AAGGUUUU	AAAACCUUU GAAGAACU
3942	UUCGGUAA	CUGAUGA	X	GAA	AGUUCUUC	GAAGAACUU UUACCGAA
3943	AUUCGGUA	CUGAUGA	X	GAA	AAGUUCUU	AAGAACUUU UACCGAAU
3944	CAUUCGGU	CUGAUGA	X	GAA	AAAGUUCU	AGAACUUUU ACCGAAUG
3945	GCAUUCGG	CUGAUGA	X	GAA	AAAAGUUC	GAACUUUUA CCGAAUGC
3959	CAAACAUG	CUGAUGA	X	GAA	AGGUGGCA	UGCCACCUC CAUGUUUG
3965	AGUCAUCA	CUGAUGA	X	GAA	ACAUGGAG	CUCCAUGUU UGAUGACU
3966	UAGUCAUC	CUGAUGA	X	GAA	AACAUGGA	UCCAUGUUU GAUGACUA
3974	CGCCCUGG	CUGAUGA	X	GAA	AGUCAUCA	UGAUGACUA CCAGGGCG
3994	GGCCAACA	CUGAUGA	X	GAA	AGUGCUGC	GCAGCACUC UGUUGGCC
3998	GAGAGGCC	CUGAUGA	X	GAA	ACAGAGUG	CACUCUGUU GGCCUCUC
4004	GCAUGGGA	CUGAUGA	X	GAA	AGGCCAAC	GUUGGCCUC UCCCAUGC
4006	CAGCAUGG	CUGAUGA	X	GAA	AGAGGCCA	UGGCCUCUC CCAUGCUG
4022	UCCAGGUG	CUGAUGA	X	GAA	AGCGCUUC	GAAGCGCUU CACCUGGA
4023	GUCCAGGU	CUGAUGA	X	GAA	AAGCGCUU	AAGCGCUUC ACCUGGAC
4052	UCUUGAGC	CUGAUGA	X	GAA	AGGCCUUG	CAAGGCCUC GCUCAAGA
4056	UCAAUCUU	CUGAUGA	X	GAA	AGCGAGGC	GCCUCGCUC AAGAUUGA
4062	CUCAAGUC	CUGAUGA	X	GAA	AUCUUGAG	CUCAAGAUU GACUUGAG
4067	UUACUCUC	CUGAUGA	X	GAA	AGUCAAUC	GAUUGACUU GAGAGUAA
4074	UUACUGGU	CUGAUGA	X	GAA	ACUCUCAA	UUGAGAGUA ACCAGUAA
4081	CUUACUUU	CUGAUGA	X	GAA	ACUGGUUA	UAACCAGUA AAAGUAAG
4087	CGACUCCU	CUGAUGA	X	GAA	ACUUUUAC	GUAAAAGUA AGGAGUCG
4094	ACAGCCCC	CUGAUGA	X	GAA	ACUCCUUA	UAAGGAGUC GGGGCUGU
4103	UGACAUCA	CUGAUGA	X	GAA	ACAGCCCC	GGGGCUGUC UGAUGUCA
4110	GGCCUGCU	CUGAUGA	X	GAA	ACAUCAGA	UCUGAUGUC AGCAGGCC
4123	AUGGCAGA	CUGAUGA	X	GAA	ACUGGGCC	GGCCCAGUU UCUGCCAU
4124	AAUGGCAG	CUGAUGA	X	GAA	AACUGGGC	GCCCAGUUU CUGCCAUU
4125	GAAUGGCA	CUGAUGA	X	GAA	AAACUGGG	CCCAGUUUC UGCCAUUC
4132	ACAGCUGG	CUGAUGA	X	GAA	AUGGCAGA	UCUGCCAUU CCAGCUGU
4133	CACAGCUG	CUGAUGA	X	GAA	AAUGGCAG	CUGCCAUUC CAGCUGUG
4149	CCUUCGCU	CUGAUGA	X	GAA	ACGUGCCC	GGGCACGUC AGCGAAGG
4169	CGUAGGUG	CUGAUGA	X	GAA	ACCUGCGC	GCGCAGGUU CACCUACG

	4170	UCGUAGGU	CUGAUGA	X	GAA	AACCUGCG	CGCAGGUUC	ACCUACGA
	4175	CGUGGUCG	CUGAUGA	X	GAA	AGGUGAAC	GUUCACCUA	CGACCACG
	4203	CAGCACGC	CUGAUGA	X	GAA	AUUUUCCU	AGGAAAAUC	GCGUGCUG
	4214	GGGGCGGG	CUGAUGA	X	GAA	AGCAGCAC	GUGCUGCUC	CCCGCCCC
5	4229	CCGAGUUG	CUGAUGA	X	GAA	AGUCUGGG	CCCAGACUA	CAACUCGG
	4235	GGACCACC	CUGAUGA	X	GAA	AGUUGUAG	CUACAACUC	GGUGGUCC
	4242	GAGUACAG	CUGAUGA	X	GAA	ACCACCGA	UCGGUGGUC	CUGUACUC
	4247	GGGUGGAG	CUGAUGA	X	GAA	ACAGGACC	GGUCCUGUA	CUCCACCC
	4250	GUGGGGUG	CUGAUGA	X	GAA	AGUACAGG	CCUGUACUC	CACCCCAC
10	4263	AAACUCUA	CUGAUGA	X	GAA	AUGGGUGG	CCACCCAUC	UAGAGUUU
	4265	UCAAACUC	CUGAUGA	X	GAA	AGAUGGGU	ACCCAUCUA	GAGUUUGA
	4270	UCGUGUCA	CUGAUGA	X	GAA	ACUCUAGA	UCUAGAGUU	UGACACGA
	4271	UUCGUGUC	CUGAUGA	X	GAA	AACUCUAG	CUAGAGUUU	GACACGAA
	4284	CUAGAAAU	CUGAUGA	X	GAA	AGGCUUCG	CGAAGCCUU	AUUUCUAG
15	4285	UCUAGAAA	CUGAUGA	X	GAA	AAGGCUUC	GAAGCCUUA	UUUCUAGA
	4287	CUUCUAGA	CUGAUGA	X	GAA	AUAAGGCU	AGCCUUAUU	UCUAGAAG
	4288	GCUUCUAG	CUGAUGA	X	GAA	AAUAAGGC	GCCUUAUUU	CUAGAAGC
	4289	UGCUUCUA	CUGAUGA	X	GAA	AAAUAAGG	CCUUAUUUC	UAGAAGCA
	4291	UGUGCUUC	CUGAUGA	X	GAA	AGAAAUAA	UUAUUUCUA	GAAGCACA
20	4305	GGUAUAAA	CUGAUGA	X	GAA	ACACAUGU	ACAUGUGUA	UUUAUACC
	4307	GGGGUAUA	CUGAUGA	X	GAA	AUACACAU	AUGUGUAUU	UAUACCCC
	4308	GGGGGUAU	CUGAUGA	X	GAA	AAUACACA	UGUGUAUUU	AUACCCCC
	4309	UGGGGGUA	CUGAUGA	X	GAA	AAAUACAC	GUGUAUUUA	UACCCCCA
	4311	CCUGGGGG	CUGAUGA	X	GAA	AUAAAUAC	GUAUUUAUA	CCCCCAGG
25	4325	GCAAAAGC	CUGAUGA	X	GAA	AGUUUCCU	AGGAAACUA	GCUUUUGC
	4329	ACUGGCAA	CUGAUGA	X	GAA	AGCUAGUU	AACUAGCUU	UUGCCAGU
	4330	UACUGGCA	CUGAUGA	X	GAA	AAGCUAGU	ACUAGCUUU	UGCCAGUA
	4331	AUACUGGC	CUGAUGA	X	GAA	AAAGCUAG	CUAGCUUUU	GCCAGUAU
	4338	AUGCAUAA	CUGAUGA	X	GAA	ACUGGCAA	UUGCCAGUA	UUAUGCAU
30	4340	AUAUGCAU	CUGAUGA	X	GAA	AUACUGGC	GCCAGUAUU	AUGCAUAU
	4341	UAUAUGCA	CUGAUGA	X	GAA	AAUACUGG	CCAGUAUUA	UGCAUAUA
	4347	AACUUAUA	CUGAUGA	X	GAA	AUGCAUAA	UUAUGCAUA	UAUAAGUU
	4349	UAAACUUA	CUGAUGA	X	GAA	AUAUGCAU	AUGCAUAUA	UAAGUUUA

	4351	UGUAAACU	CUGAUGA	X	GAA	AUAUAUGC	GCAUAUAUA	AGUUUACA
	4355	AAGGUGUA	CUGAUGA	X	GAA	ACUUAUAU	AUAUAAGUU	UACACCUU
	4356	AAAGGUGU	CUGAUGA	X	GAA	AACUUAUA	UAUAAGUUU	ACACCUUU
	4357	UAAAGGUG	CUGAUGA	X	GAA	AAACUUAU	AUAAGUUUA	CACCUUUA
5	4363	GAAAGAUA	CUGAUGA	X	GAA	AGGUGUAA	UUACACCUU	UAUCUUUC
	4364	GGAAAGAU	CUGAUGA	X	GAA	AAGGUGUA	UACACCUUU	AUCUUUCC
	4365	UGGAAAGA	CUGAUGA	X	GAA	AAAGGUGU	ACACCUUUA	UCUUUCCA
	4367	CAUGGAAA	CUGAUGA	X	GAA	AUAAAGGU	ACCUUUAUC	UUUCCAUG
	4369	CCCAUGGA	CUGAUGA	X	GAA	AGAUAAAG	CUUUAUCUU	UCCAUGGG
10	4370	UCCCAUGG	CUGAUGA	X	GAA	AAGAUAAA	UUUAUCUUU	CCAUGGGA
	4371	CUCCCAUG	CUGAUGA	X	GAA	AAAGAUAA	UUAUCUUUC	CAUGGGAG
	4389	AUCACAAA	CUGAUGA	X	GAA	AGCAGCUG	CAGCUGCUU	UUUGUGAU
	4390	AAUCACAA	CUGAUGA	X	GAA	AAGCAGCU	AGCUGCUUU	UUGUGAUU
	4391	AAAUCACA	CUGAUGA	X	GAA	AAAGCAGC	GCUGCUUUU	UGUGAUUU
15	4392	AAAAUCAC	CUGAUGA	X	GAA	AAAAGCAG	CUGCUUUUU	GUGAUUUU
	4398	AUUAAAAA	CUGAUGA	X	GAA	AUCACAAA	UUUGUGAUU	UUUUUAAU
	4399	UAUUAAAA	CUGAUGA	X	GAA	AAUCACAA	UUGUGAUUU	UUUUAAUA
	4400	CUAUUAAA	CUGAUGA	X	GAA	AAAUCACA	UGUGAUUUU	UUUAAUAG
	4401	ACUAUUAA	CUGAUGA	X	GAA	AAAAUCAC	GUGAUUUUU	UUAAUAGU
20	4402	CACUAUUA	CUGAUGA	X	GAA	AAAAAUCA	UGAUUUUUU	UAAUAGUG
	4403	GCACUAUU	CUGAUGA	X	GAA	AAAAAAUC	GAUUUUUUU	AAUAGUGC
	4404	AGCACUAU	CUGAUGA	X	GAA	AAAAAAAU	AUUUUUUUA	AUAGUGCU
	4407	AAAAGCAC	CUGAUGA	X	GAA	AUUAAAAA	UUUUUAAUA	GUGCUUUU
	4413	AAAAAAAA	CUGAUGA	X	GAA	AGCACUAU	AUAGUGCUU	UUUUUUUU
25	4414	AAAAAAAA	CUGAUGA	X	GAA	AAGCACUA	UAGUGCUUU	UUUUUUUU
	4415	CAAAAAAA	CUGAUGA	X	GAA	AAAGCACU	AGUGCUUUU	UUUUUUUG
	4416	UCAAAAAA	CUGAUGA	X	GAA	AAAAGCAC	GUGCUUUUU	UUUUUUGA
	4417	GUCAAAAA	CUGAUGA	X	GAA	AAAAAGCA	UGCUUUUUU	UUUUUGAC
	4418	AGUCAAAA	CUGAUGA	X	GAA	AAAAAAGC	GCUUUUUUU	UUUUGACU
30	4419	UAGUCAAA	CUGAUGA	X	GAA	AAAAAAAG	CUUUUUUUU	UUUGACUA
	4420	UUAGUCAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUGACUAA
	4421	GUUAGUCA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UGACUAAC
	4422	UGUUAGUC	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	GACUAACA

	4427	AUUCUUGU	CUGAUGA	X	GAA	AGUCAAAA	UUUUGACUA	ACAAGAAU
	4438	UCUGGAGU	CUGAUGA	X	GAA	ACAUUCUU	AAGAAUGUA	ACUCCAGA
	4442	UCUAUCUG	CUGAUGA	X	GAA	AGUUACAU	AUGUAACUC	CAGAUAGA
	4448	UAUUUCUC	CUGAUGA	X	GAA	AUCUGGAG	CUCCAGAUA	GAGAAAUA
5	4456	CUUGUCAC	CUGAUGA	X	GAA	AUUUCUCU	AGAGAAAUA	GUGACAAG
	4476	UUUAGCAG	CUGAUGA	X	GAA	AGUGUUCU	AGAACACUA	CUGCUAAA
	4482	UGAGGAUU	CUGAUGA	X	GAA	AGCAGUAG	CUACUGCUA	AAUCCUCA
	4486	AACAUGAG	CUGAUGA	X	GAA	AUUUAGCA	UGCUAAAUC	CUCAUGUU
	4489	AGUAACAU	CUGAUGA	X	GAA	AGGAUUUA	UAAAUCCUC	AUGUUACU
10	4494	CACUGAGU	CUGAUGA	X	GAA	ACAUGAGG	CCUCAUGUU	ACUCAGUG
	4495	ACACUGAG	CUGAUGA	X	GAA	AACAUGAG	CUCAUGUUA	CUCAGUGU
	4498	CUAACACU	CUGAUGA	X	GAA	AGUAACAU	AUGUUACUC	AGUGUUAG
	4504	AUUUCUCU	CUGAUGA	X	GAA	ACACUGAG	CUCAGUGUU	AGAGAAAU
	4505	GAUUUCUC	CUGAUGA	X	GAA	AACACUGA	UCAGUGUUA	GAGAAAUC
15	4513	UUAGGAAG	CUGAUGA	X	GAA	AUUUCUCU	AGAGAAAUC	CUUCCUAA
	4516	GGUUUAGG	CUGAUGA	X	GAA	AGGAUUUC	GAAAUCCUU	CCUAAACC
	4517	GGGUUUAG	CUGAUGA	X	GAA	AAGGAUUU	AAAUCCUUC	CUAAACCC
	4520	AUUGGGUU	CUGAUGA	X	GAA	AGGAAGGA	UCCUUCCUA	AACCCAAU
	4533	GAGCAGGG	CUGAUGA	X	GAA	AGUCAUUG	CAAUGACUU	CCCUGCUC
20	4534	GGAGCAGG	CUGAUGA	X	GAA	AAGUCAUU	AAUGACUUC	CCUGCUCC
	4541	GGGGGUUG	CUGAUGA	X	GAA	AGCAGGGA	UCCCUGCUC	CAACCCCC
	4557	CGUGCCCU	CUGAUGA	X	GAA	AGGUGGCG	CGCCACCUC	AGGGCACG
	4576	CUCAAUCA	CUGAUGA	X	GAA	ACUGGUCC	GGACCAGUU	UGAUUGAG
	4577	CCUCAAUC	CUGAUGA	X	GAA	AACUGGUC	GACCAGUUU	GAUUGAGG
25	4581	AGCUCCUC	CUGAUGA	X	GAA	AUCAAACU	AGUUUGAUU	GAGGAGCU
	4598	CAUUGGGU	CUGAUGA	X	GAA	AUCAGUGC	GCACUGAUC	ACCCAAUG
	4610	GGGUACGU	CUGAUGA	X	GAA	AUGCAUUG	CAAUGCAUC	ACGUACCC
	4615	CAGUGGGG	CUGAUGA	X	GAA	ACGUGAUG	CAUCACGUA	CCCCACUG
	4664	CUGGGGCU	CUGAUGA	X	GAA	ACGGGCUU	AAGCCCGUU	AGCCCCAG
30	4665	CCUGGGGC	CUGAUGA	X	GAA	AACGGGCU	AGCCCGUUA	GCCCCAGG
	4678	CAGCCAGU	CUGAUGA	X	GAA	AUCCCCUG	CAGGGGAUC	ACUGGCUG
	4700	ACUCCCGA	CUGAUGA	X	GAA	AUGUUGCU	AGCAACAUC	UCGGGAGU
	4702	GGACUCCC	CUGAUGA	X	GAA	AGAUGUUG	CAACAUCUC	GGGAGUCC

4709	UGCUAGAG CUGAUGA X GAA	ACUCCCGA	UCGGGAGUC CUCUAGCA
4712	GCCUGCUA CUGAUGA X GAA	AGGACUCC	GGAGUCCUC UAGCAGGC
4714	AGGCCUGC CUGAUGA X GAA	AGAGGACU	AGUCCUCUA GCAGGCCU
4723	ACAUGUCU CUGAUGA X GAA	AGGCCUGC	GCAGGCCUA AGACAUGU
4802	GCGUCUCA CUGAUGA X GAA	AUUCUUUC	GAAAGAAUU UGAGACGC
4803	UGCGUCUC CUGAUGA X GAA	AAUUCUUU	AAAGAAUUU GAGACGCA
4840	GCAUUGCU CUGAUGA X GAA	AGCCCCGU	ACGGGGCUC AGCAAUGC
4852	GCCACUGA CUGAUGA X GAA	AUGGCAUU	AAUGCCAUU UCAGUGGC
4853	AGCCACUG CUGAUGA X GAA	AAUGGCAU	AUGCCAUUU CAGUGGCU
4854	AAGCCACU CUGAUGA X GAA	AAAUGGCA	UGCCAUUUC AGUGGCUU
4862	GAGCUGGG CUGAUGA X GAA	AGCCACUG	CAGUGGCUU CCCAGCUC
4863	AGAGCUGG CUGAUGA X GAA	AAGCCACU	AGUGGCUUC CCAGCUCU
4870	AAGGGUCA CUGAUGA X GAA	AGCUGGGA	UCCCAGCUC UGACCCUU
4878	AAAUGUAG CUGAUGA X GAA	AGGGUCAG	CUGACCCUU CUACAUUU
4879	CAAAUGUA CUGAUGA X GAA	AAGGGUCA	UGACCCUUC UACAUUUG
4881	CUCAAAUG CUGAUGA X GAA	AGAAGGGU	ACCCUUCUA CAUUUGAG
4885	GGCCCUCA CUGAUGA X GAA	AUGUAGAA	UUCUACAUU UGAGGGCC
4886	GGGCCCUC CUGAUGA X GAA	AAUGUAGA	UCUACAUUU GAGGGCCC
4929	AUCCAGAA CUGAUGA X GAA	AUGUCCCC	GGGGACAUU UUCUGGAU
4930	AAUCCAGA CUGAUGA X GAA	AAUGUCCC	GGGACAUUU UCUGGAUU
4931	GAAUCCAG CUGAUGA X GAA	AAAUGUCC	GGACAUUUU CUGGAUUC
4932	AGAAUCCA CUGAUGA X GAA	AAAAUGUC	GACAUUUUC UGGAUUCU
4938	CCUCCCAG CUGAUGA X GAA	AUCCAGAA	UUCUGGAUU CUGGGAGG
4939	GCCUCCCA CUGAUGA X GAA	AAUCCAGA	UCUGGAUUC UGGGAGGC
4963	AAAAAAGA CUGAUGA X GAA	AUUUGUCC	GGACAAAUA UCUUUUUU
4965	CCAAAAAA CUGAUGA X GAA	AUAUUUGU	ACAAAUAUC UUUUUUGG
4967	UUCCAAAA CUGAUGA X GAA	AGAUAUUU	AAAUAUCUU UUUUGGAA
4968	GUUCCAAA CUGAUGA X GAA	AAGAUAUU	AAUAUCUUU UUUGGAAC
4969	AGUUCCAA CUGAUGA X GAA	AAAGAUAU	AUAUCUUUU UUGGAACU
4970	UAGUUCCA CUGAUGA X GAA	AAAAGAUA	UAUCUUUUU UGGAACUA
4971	UUAGUUCC CUGAUGA X GAA	AAAAAGAU	AUCUUUUUU GGAACUAA
4978	AUUUGCUU CUGAUGA X GAA	AGUUCCAA	UUGGAACUA AAGCAAAU
4987	AGGUCUAA CUGAUGA X GAA	AUUUGCUU	AAGCAAAUU UUAGACCU

4988	AAGGUCUA CUGAUGA X GAA	AAUUUGCU	AGCAAAUUU UAGACCUU
4989	AAAGGUCU CUGAUGA X GAA	AAAUUUGC	GCAAAUUUU AGACCUUU
4990	UAAAGGUC CUGAUGA X GAA	AAAAUUUG	CAAAUUUUA GACCUUUA
4996	CAUAGGUA CUGAUGA X GAA	AGGUCUAA	UUAGACCUU UACCUAUG
4997	CCAUAGGU CUGAUGA X GAA	AAGGUCUA	UAGACCUUU ACCUAUGG
4998	UCCAUAGG CUGAUGA X GAA	AAAGGUCU	AGACCUUUA CCUAUGGA
5002	CACUUCCA CUGAUGA X GAA	AGGUAAAG	CUUUACCUA UGGAAGUG
5013	GGACAUAG CUGAUGA X GAA	ACCACUUC	GAAGUGGUU CUAUGUCC
5014	UGGACAUA CUGAUGA X GAA	AACCACUU	AAGUGGUUC UAUGUCCA
5016	AAUGGACA CUGAUGA X GAA	AGAACCAC	GUGGUUCUA UGUCCAUU
5020	UGAGAAUG CUGAUGA X GAA	ACAUAGAA	UUCUAUGUC CAUUCUCA
5024	CGAAUGAG CUGAUGA X GAA	AUGGACAU	AUGUCCAUU CUCAUUCG
5025	ACGAAUGA CUGAUGA X GAA	AAUGGACA	UGUCCAUUC UCAUUCGU
5027	CCACGAAU CUGAUGA X GAA	AGAAUGGA	UCCAUUCUC AUUCGUGG
5030	AUGCCACG CUGAUGA X GAA	AUGAGAAU	AUUCUCAUU CGUGGCAU
5031	CAUGCCAC CUGAUGA X GAA	AAUGAGAA	UUCUCAUUC GUGGCAUG
5041	CAAAUCAA CUGAUGA X GAA	ACAUGCCA	UGGCAUGUU UUGAUUUG
5042	ACAAAUCA CUGAUGA X GAA	AACAUGCC	GGCAUGUUU UGAUUUGU
5043	UACAAAUC CUGAUGA X GAA	AAACAUGC	GCAUGUUUU GAUUUGUA
5047	GUGCUACA CUGAUGA X GAA	AUCAAAAC	GUUUUGAUU UGUAGCAC
5048	AGUGCUAC CUGAUGA X GAA	AAUCAAAA	UUUUGAUUU GUAGCACU
5051	CUCAGUGC CUGAUGA X GAA	ACAAAUCA	UGAUUUGUA GCACUGAG
5069	UCAGAGUU CUGAUGA X GAA	AGUGCCAC	GUGGCACUC AACUCUGA
5074	UGGGCUCA CUGAUGA X GAA	AGUUGAGU	ACUCAACUC UGAGCCCA
5084	GCCAAAAG CUGAUGA X GAA	AUGGGCUC	GAGCCCAUA CUUUUGGC
5087	GGAGCCAA CUGAUGA X GAA	AGUAUGGG	CCCAUACUU UUGGCUCC
5088	AGGAGCCA CUGAUGA X GAA	AAGUAUGG	CCAUACUUU UGGCUCCU
5089	GAGGAGCC CUGAUGA X GAA	AAAGUAUG	CAUACUUUU GGCUCCUC
5094	UACUAGAG CUGAUGA X GAA	AGCCAAAA	UUUUGGCUC CUCUAGUA
5097	UCUUACUA CUGAUGA X GAA	AGGAGCCA	UGGCUCCUC UAGUAAGA
5099	CAUCUUAC CUGAUGA X GAA	AGAGGAGC	GCUCCUCUA GUAAGAUG
5102	GUGCAUCU CUGAUGA X GAA	ACUAGAGG	CCUCUAGUA AGAUGCAC
5119	CUCUGGCU CUGAUGA X GAA	AGUUUUCA	UGAAAACUU AGCCAGAG

	5120	ACUCUGGC	CUGAUGA	X	GAA	AAGUUUUC	GAAAACUUA	GCCAGAGU
	5129	GACAACCU	CUGAUGA	X	GAA	ACUCUGGC	GCCAGAGUU	AGGUUGUC
	5130	AGACAACC	CUGAUGA	X	GAA	AACUCUGG	CCAGAGUUA	GGUUGUCU
	5134	CUGGAGAC	CUGAUGA	X	GAA	ACCUAACU	AGUUAGGUU	GUCUCCAG
5	5137	GGCCUGGA	CUGAUGA	X	GAA	ACAACCUA	UAGGUUGUC	UCCAGGCC
	5139	AUGGCCUG	CUGAUGA	X	GAA	AGACAACC	GGUUGUCUC	CAGGCCAU
	5156	UUCAGUGU	CUGAUGA	X	GAA	AGGCCAUC	GAUGGCCUU	ACACUGAA
	5157	UUUCAGUG	CUGAUGA	X	GAA	AAGGCCAU	AUGGCCUUA	CACUGAAA
	5170	UAGAAUGU	CUGAUGA	X	GAA	ACAUUUUC	GAAAAUGUC	ACAUUCUA
10	5175	CAAAAUAG	CUGAUGA	X	GAA	AUGUGACA	UGUCACAUU	CUAUUUUG
	5176	CCAAAAUA	CUGAUGA	X	GAA	AAUGUGAC	GUCACAUUC	UAUUUUGG
	5178	ACCCAAAA	CUGAUGA	X	GAA	AGAAUGUG	CACAUUCUA	UUUUGGGU
	5180	AUACCCAA	CUGAUGA	X	GAA	AUAGAAUG	CAUUCUAUU	UUGGGUAU
	5181	AAUACCCA	CUGAUGA	X	GAA	AAUAGAAU	AUUCUAUUU	UGGGUAUU
15	5182	UAAUACCC	CUGAUGA	X	GAA	AAAUAGAA	UUCUAUUUU	GGGUAUUA
	5187	UAUAUUAA	CUGAUGA	X	GAA	ACCCAAAA	UUUUGGGUA	UUAAUAUA
	5189	UAUAUAUU	CUGAUGA	X	GAA	AUACCCAA	UUGGGUAUU	AAUAUAUA
	5190	CUAUAUAU	CUGAUGA	X	GAA	AAUACCCA	UGGGUAUUA	AUAUAUAG
	5193	GGACUAUA	CUGAUGA	X	GAA	AUUAAUAC	GUAUUAAUA	UAUAGUCC
20	5195	CUGGACUA	CUGAUGA	X	GAA	AUAUUAAU	AUUAAUAUA	UAGUCCAG
	5197	GUCUGGAC	CUGAUGA	X	GAA	AUAUAUUA	UAAUAUAUA	GUCCAGAC
	5200	AGUGUCUG	CUGAUGA	X	GAA	ACUAUAUA	UAUAUAGUC	CAGACACU
	5209	AUUGAGUU	CUGAUGA	X	GAA	AGUGUCUG	CAGACACUU	AACUCAAU
	5210	AAUUGAGU	CUGAUGA	X	GAA	AAGUGUCU	AGACACUUA	ACUCAAUU
25	5214	AAGAAAUU	CUGAUGA	X	GAA	AGUUAAGU	ACUUAACUC	AAUUUCUU
	5218	UACCAAGA	CUGAUGA	X	GAA	AUUGAGUU	AACUCAAUU	UCUUGGUA
	5219	AUACCAAG	CUGAUGA	X	GAA	AAUUGAGU	ACUCAAUUU	CUUGGUAU
	5220	AAUACCAA	CUGAUGA	X	GAA	AAAUUGAG	CUCAAUUUC	UUGGUAUU
	5222	AUAAUACC	CUGAUGA	X	GAA	AGAAAUUG	CAAUUUCUU	GGUAUUAU
30	5226	CAGAAUAA	CUGAUGA	X	GAA	ACCAAGAA	UUCUUGGUA	UUAUUCUG
	5228	AACAGAAU	CUGAUGA	X	GAA	AUACCAAG	CUUGGUAUU	AUUCUGUU
	5229	AAACAGAA	CUGAUGA	X	GAA	AAUACCAA	UUGGUAUUA	UUCUGUUU
	5231	CAAAACAG	CUGAUGA	X	GAA	AUAAUACC	GGUAUUAUU	CUGUUUUG

	5232	GCAAAACA	CUGAUGA	X	GAA	AAUAAUAC	GUAUUAUUC	UGUUUUGC
	5236	CUGUGCAA	CUGAUGA	X	GAA	ACAGAAUA	UAUUCUGUU	UUGCACAG
	5237	ACUGUGCA	CUGAUGA	X	GAA	AACAGAAU	AUUCUGUUU	UGCACAGU
	5238	AACUGUGC	CUGAUGA	X	GAA	AAACAGAA	UUCUGUUUU	GCACAGUU
5	5246	UCACAACU	CUGAUGA	X	GAA	ACUGUGCA	UGCACAGUU	AGUUGUGA
	5247	UUCACAAC	CUGAUGA	X	GAA	AACUGUGC	GCACAGUUA	GUUGUGAA
	5250	UCUUUCAC	CUGAUGA	X	GAA	ACUAACUG	CAGUUAGUU	GUGAAAGA
	5284	CUCCUCAG	CUGAUGA	X	GAA	ACUGCAUU	AAUGCAGUC	CUGAGGAG
	5296	AUGGAGAA	CUGAUGA	X	GAA	ACUCUCCU	AGGAGAGUU	UUCUCCAU
10	5297	UAUGGAGA	CUGAUGA	X	GAA	AACUCUCC	GGAGAGUUU	UCUCCAUA
	5298	AUAUGGAG	CUGAUGA	X	GAA	AAACUCUC	GAGAGUUUU	CUCCAUAU
	5299	GAUAUGGA	CUGAUGA	X	GAA	AAAACUCU	AGAGUUUUC	UCCAUAUC
	5301	UUGAUAUG	CUGAUGA	X	GAA	AGAAAACU	AGUUUUCUC	CAUAUCAA
	5305	CGUUUUGA	CUGAUGA	X	GAA	AUGGAGAA	UUCUCCAUA	UCAAAACG
15	5307	CUCGUUUU	CUGAUGA	X	GAA	AUAUGGAG	CUCCAUAUC	AAAACGAG
	5336	ACCUUAUU	CUGAUGA	X	GAA	ACCUUUUU	AAAAAGGUC	AAUAAGGU
	5340	CUUGACCU	CUGAUGA	X	GAA	AUUGACCU	AGGUCAAUA	AGGUCAAG
	5345	CUUCCCUU	CUGAUGA	X	GAA	ACCUUAUU	AAUAAGGUC	AAGGGAAG
	5361	GGUAUAGA	CUGAUGA	X	GAA	ACGGGGUC	GACCCCGUC	UCUAUACC
20	5363	UUGGUAUA	CUGAUGA	X	GAA	AGACGGGG	CCCCGUCUC	UAUACCAA
	5365	GGUUGGUA	CUGAUGA	X	GAA	AGAGACGG	CCGUCUCUA	UACCAACC
	5367	UUGGUUGG	CUGAUGA	X	GAA	AUAGAGAC	GUCUCUAUA	CCAACCAA
	5382	UGUUGGUG	CUGAUGA	X	GAA	AUUGGUUU	AAACCAAUU	CACCAACA
	5383	GUGUUGGU	CUGAUGA	X	GAA	AAUUGGUU	AACCAAUUC	ACCAACAC
25	5395	UGGGUCCC	CUGAUGA	X	GAA	ACUGUGUU	AACACAGUU	GGGACCCA
	5417	ACGUGACU	CUGAUGA	X	GAA	ACUUCCUG	CAGGAAGUC	AGUCACGU
	5421	GGAAACGU	CUGAUGA	X	GAA	ACUGACUU	AAGUCAGUC	ACGUUUCC
	5426	GAAAAGGA	CUGAUGA	X	GAA	ACGUGACU	AGUCACGUU	UCCUUUUC
	5427	UGAAAAGG	CUGAUGA	X	GAA	AACGUGAC	GUCACGUUU	CCUUUUCA
30	5428	AUGAAAAG	CUGAUGA	X	GAA	AAACGUGA	UCACGUUUC	CUUUUCAU
	5431	UAAAUGAA	CUGAUGA	X	GAA	AGGAAACG	CGUUUCCUU	UUCAUUUA
	5432	UUAAAUGA	CUGAUGA	X	GAA	AAGGAAAC	GUUUCCUUU	UCAUUUAA
	5433	AUUAAAUG	CUGAUGA	X	GAA	AAAGGAAA	UUUCCUUUU	CAUUUAAU

	5434	CAUUAAAU	CUGAUGA	X	GAA	AAAAGGAA	UUCCUUUUC	AUUUAAUG
	5437	CCCCAUUA	CUGAUGA	X	GAA	AUGAAAAG	CUUUUCAUU	UAAUGGGG
	5438	UCCCCAUU	CUGAUGA	X	GAA	AAUGAAAA	UUUUCAUUU	AAUGGGGA
	5439	AUCCCCAU	CUGAUGA	X	GAA	AAAUGAAA	UUUCAUUUA	AUGGGGAU
5	5448	GAUAGUGG	CUGAUGA	X	GAA	AUCCCCAU	AUGGGGAUU	CCACUAUC
	5449	AGAUAGUG	CUGAUGA	X	GAA	AAUCCCCA	UGGGGAUUC	CACUAUCU
	5454	GUGUGAGA	CUGAUGA	X	GAA	AGUGGAAU	AUUCCACUA	UCUCACAC
	5456	UAGUGUGA	CUGAUGA	X	GAA	AUAGUGGA	UCCACUAUC	UCACACUA
	5458	AUUAGUGU	CUGAUGA	X	GAA	AGAUAGUG	CACUAUCUC	ACACUAAU
10	5464	UUUCAGAU	CUGAUGA	X	GAA	AGUGUGAG	CUCACACUA	AUCUGAAA
	5467	UCCUUUCA	CUGAUGA	X	GAA	AUUAGUGU	ACACUAAUC	UGAAAGGA
	5489	CGCCAGCU	CUGAUGA	X	GAA	AUGCUCUU	AAGAGCAUU	AGCUGGCG
	5490	GCGCCAGC	CUGAUGA	X	GAA	AAUGCUCU	AGAGCAUUA	GCUGGCGC
	5501	GUGCUUAA	CUGAUGA	X	GAA	AUGCGCCA	UGGCGCAUA	UUAAGCAC
15	5503	AAGUGCUU	CUGAUGA	X	GAA	AUAUGCGC	GCGCAUAUU	AAGCACUU
	5504	AAAGUGCU	CUGAUGA	X	GAA	AAUAUGCG	CGCAUAUUA	AGCACUUU
	5511	GGAGCUUA	CUGAUGA	X	GAA	AGUGCUUA	UAAGCACUU	UAAGCUCC
	5512	AGGAGCUU	CUGAUGA	X	GAA	AAGUGCUU	AAGCACUUU	AAGCUCCU
	5513	AAGGAGCU	CUGAUGA	X	GAA	AAAGUGCU	AGCACUUUA	AGCUCCUU
20	5518	UACUCAAG	CUGAUGA	X	GAA	AGCUUAAA	UUUAAGCUC	CUUGAGUA
	5521	UUUUACUC	CUGAUGA	X	GAA	AGGAGCUU	AAGCUCCUU	GAGUAAAA
	5526	CACCUUUU	CUGAUGA	X	GAA	ACUCAAGG	CCUUGAGUA	AAAAGGUG
	5537	AAAUUACA	CUGAUGA	X	GAA	ACCACCUU	AAGGUGGUA	UGUAAUUU
	5541	GCAUAAAU	CUGAUGA	X	GAA	ACAUACCA	UGGUAUGUA	AUUUAUGC
25	5544	CUUGCAUA	CUGAUGA	X	GAA	AUUACAUA	UAUGUAAUU	UAUGCAAG
	5545	CCUUGCAU	CUGAUGA	X	GAA	AAUUACAU	AUGUAAUUU	AUGCAAGG
	5546	ACCUUGCA	CUGAUGA	X	GAA	AAAUUACA	UGUAAUUUA	UGCAAGGU
	5555	UGGAGAAA	CUGAUGA	X	GAA	ACCUUGCA	UGCAAGGUA	UUUCUCCA
	5557	ACUGGAGA	CUGAUGA	X	GAA	AUACCUUG	CAAGGUAUU	UCUCCAGU
30	5558	AACUGGAG	CUGAUGA	X	GAA	AAUACCUU	AAGGUAUUU	CUCCAGUU
	5559	CAACUGGA	CUGAUGA	X	GAA	AAAUACCU	AGGUAUUUC	UCCAGUUG
	5561	CCCAACUG	CUGAUGA	X	GAA	AGAAAUAC	GUAUUUCUC	CAGUUGGG
	5566	UGAGUCCC	CUGAUGA	X	GAA	ACUGGAGA	UCUCCAGUU	GGGACUCA

	5573	AAUAUCCU	CUGAUGA	X	GAA	AGUCCCAA	UUGGGACUC	AGGAUAUU
	5579	UUAACUAA	CUGAUGA	X	GAA	AUCCUGAG	CUCAGGAUA	UUAGUUAA
	5581	CAUUAACU	CUGAUGA	X	GAA	AUAUCCUG	CAGGAUAUU	AGUUAAUG
	5582	UCAUUAAC	CUGAUGA	X	GAA	AAUAUCCU	AGGAUAUUA	GUUAAUGA
5	5585	GGCUCAUU	CUGAUGA	X	GAA	ACUAAUAU	AUAUUAGUU	AAUGAGCC
	5586	UGGCUCAU	CUGAUGA	X	GAA	AACUAAUA	UAUUAGUUA	AUGAGCCA
	5596	CUUCUAGU	CUGAUGA	X	GAA	AUGGCUCA	UGAGCCAUC	ACUAGAAG
	5600	UUUUCUUC	CUGAUGA	X	GAA	AGUGAUGG	CCAUCACUA	GAAGAAAA
	5615	CAGUUGAA	CUGAUGA	X	GAA	AUGGGCUU	AAGCCCAUU	UUCAACUG
10	5616	GCAGUUGA	CUGAUGA	X	GAA	AAUGGGCU	AGCCCAUUU	UCAACUGC
	5617	AGCAGUUG	CUGAUGA	X	GAA	AAAUGGGC	GCCCAUUUU	CAACUGCU
	5618	AAGCAGUU	CUGAUGA	X	GAA	AAAAUGGG	CCCAUUUUC	AACUGCUU
	5626	AAGUUUCA	CUGAUGA	X	GAA	AGCAGUUG	CAACUGCUU	UGAAACUU
	5627	CAAGUUUC	CUGAUGA	X	GAA	AAGCAGUU	AACUGCUUU	GAAACUUG
15	5634	CCCCAGGC	CUGAUGA	X	GAA	AGUUUCAA	UUGAAACUU	GCCUGGGG
	5644	CAUGCUCA	CUGAUGA	X	GAA	ACCCCAGG	CCUGGGGUC	UGAGCAUG
	5661	UGUCUCCC	CUGAUGA	X	GAA	AUUCCCAU	AUGGGAAUA	GGGAGACA
	5674	CCCUUUCC	CUGAUGA	X	GAA	ACCCUGUC	GACAGGGUA	GGAAAGGG
	5688	CUGAAGAG	CUGAUGA	X	GAA	AGGCGCCC	GGGCGCCUA	CUCUUCAG
20	5691	ACCCUGAA	CUGAUGA	X	GAA	AGUAGGCG	CGCCUACUC	UUCAGGGU
	5693	AGACCCUG	CUGAUGA	X	GAA	AGAGUAGG	CCUACUCUU	CAGGGUCU
	5694	UAGACCCU	CUGAUGA	X	GAA	AAGAGUAG	CUACUCUUC	AGGGUCUA
	5700	GAUCUUUA	CUGAUGA	X	GAA	ACCCUGAA	UUCAGGGUC	UAAAGAUC
	5702	UUGAUCUU	CUGAUGA	X	GAA	AGACCCUG	CAGGGUCUA	AAGAUCAA
25	5708	GCCCACUU	CUGAUGA	X	GAA	AUCUUUAG	CUAAAGAUC	AAGUGGGC
	5719	AGCGAUCC	CUGAUGA	X	GAA	AGGCCCAC	GUGGGCCUU	GGAUCGCU
	5724	AGCUUAGC	CUGAUGA	X	GAA	AUCCAAGG	CCUUGGAUC	GCUAAGCU
	5728	AGCCAGCU	CUGAUGA	X	GAA	AGCGAUCC	GGAUCGCUA	AGCUGGCU
	5737	AUCAAACA	CUGAUGA	X	GAA	AGCCAGCU	AGCUGGCUC	UGUUUGAU
30	5741	UAGCAUCA	CUGAUGA	X	GAA	ACAGAGCC	GGCUCUGUU	UGAUGCUA
	5742	AUAGCAUC	CUGAUGA	X	GAA	AACAGAGC	GCUCUGUUU	GAUGCUAU
	5749	UGCAUAAA	CUGAUGA	X	GAA	AGCAUCAA	UUGAUGCUA	UUUAUGCA
	5751	CUUGCAUA	CUGAUGA	X	GAA	AUAGCAUC	GAUGCUAUU	UAUGCAAG

	5752	ACUUGCAU	CUGAUGA	X	GAA	AAUAGCAU	AUGCUAUUU	AUGCAAGU
	5753	AACUUGCA	CUGAUGA	X	GAA	AAAUAGCA	UGCUAUUUA	UGCAAGUU
	5761	UAGACCCU	CUGAUGA	X	GAA	ACUUGCAU	AUGCAAGUU	AGGGUCUA
	5762	AUAGACCC	CUGAUGA	X	GAA	AACUUGCA	UGCAAGUUA	GGGUCUAU
5	5767	AAUACAUA	CUGAUGA	X	GAA	ACCCUAAC	GUUAGGGUC	UAUGUAUU
	5769	UAAAUACA	CUGAUGA	X	GAA	AGACCCUA	UAGGGUCUA	UGUAUUUA
	5773	AUCCUAAA	CUGAUGA	X	GAA	ACAUAGAC	GUCUAUGUA	UUUAGGAU
	5775	GCAUCCUA	CUGAUGA	X	GAA	AUACAUAG	CUAUGUAUU	UAGGAUGC
	5776	CGCAUCCU	CUGAUGA	X	GAA	AAUACAUA	UAUGUAUUU	AGGAUGCG
10	5777	GCGCAUCC	CUGAUGA	X	GAA	AAAUACAU	AUGUAUUUA	GGAUGCGC
	5788	CUGAAGAG	CUGAUGA	X	GAA	AGGCGCAU	AUGCGCCUA	CUCUUCAG
	5791	ACCCUGAA	CUGAUGA	X	GAA	AGUAGGCG	CGCCUACUC	UUCAGGGU
	5793	AGACCCUG	CUGAUGA	X	GAA	AGAGUAGG	CCUACUCUU	CAGGGUCU
	5794	UAGACCCU	CUGAUGA	X	GAA	AAGAGUAG	CUACUCUUC	AGGGUCUA
15	5800	GAUCUUUA	CUGAUGA	X	GAA	ACCCUGAA	UUCAGGGUC	UAAAGAUC
	5802	UUGAUCUU	CUGAUGA	X	GAA	AGACCCUG	CAGGGUCUA	AAGAUCAA
	5808	GCCCACUU	CUGAUGA	X	GAA	AUCUUUAG	CUAAAGAUC	AAGUGGGC
	5819	AGCGAUCC	CUGAUGA	X	GAA	AGGCCCAC	GUGGGCCUU	GGAUCGCU
	5824	AGCUUAGC	CUGAUGA	X	GAA	AUCCAAGG	CCUUGGAUC	GCUAAGCU
20	5828	AGCCAGCU	CUGAUGA	X	GAA	AGCGAUCC	GGAUCGCUA	AGCUGGCU
	5837	AUCAAACA	CUGAUGA	X	GAA	AGCCAGCU	AGCUGGCUC	UGUUUGAU
	5841	UAGCAUCA	CUGAUGA	X	GAA	ACAGAGCC	GGCUCUGUU	UGAUGCUA
	5842	AUAGCAUC	CUGAUGA	X	GAA	AACAGAGC	GCUCUGUUU	GAUGCUAU
	5849	UGCAUAAA	CUGAUGA	X	GAA	AGCAUCAA	UUGAUGCUA	UUUAUGCA
25	5851	CUUGCAUA	CUGAUGA	X	GAA	AUAGCAUC	GAUGCUAUU	UAUGCAAG
	5852	ACUUGCAU	CUGAUGA	X	GAA	AAUAGCAU	AUGCUAUUU	AUGCAAGU
	5853	AACUUGCA	CUGAUGA	X	GAA	AAAUAGCA	UGCUAUUUA	UGCAAGUU
	5861	UAGACCCU	CUGAUGA	X	GAA	ACUUGCAU	AUGCAAGUU	AGGGUCUA
	5862	AUAGACCC	CUGAUGA	X	GAA	AACUUGCA	UGCAAGUUA	GGGUCUAU
30	5867	AAUACAUA	CUGAUGA	X	GAA	ACCCUAAC	GUUAGGGUC	UAUGUAUU
	5869	UAAAUACA	CUGAUGA	X	GAA	AGACCCUA	UAGGGUCUA	UGUAUUUA
	5873	AUCCUAAA	CUGAUGA	X	GAA	ACAUAGAC	GUCUAUGUA	UUUAGGAU
	5875	ACAUCCUA	CUGAUGA	X	GAA	AUACAUAG	CUAUGUAUU	UAGGAUGU

	5876	GACAUCCU	CUGAUGA	X	GAA	AAUACAUA	UAUGUAUUU	AGGAUGUC
	5877	AGACAUCC	CUGAUGA	X	GAA	AAAUACAU	AUGUAUUUA	GGAUGUCU
	5884	AAGGUGCA	CUGAUGA	X	GAA	ACAUCCUA	UAGGAUGUC	UGCACCUU
	5892	GGCUGCAG	CUGAUGA	X	GAA	AGGUGCAG	CUGCACCUU	CUGCAGCC
5	5893	UGGCUGCA	CUGAUGA	X	GAA	AAGGUGCA	UGCACCUUC	UGCAGCCA
	5904	CAGCUUCU	CUGAUGA	X	GAA	ACUGGCUG	CAGCCAGUC	AGAAGCUG
	5930	GAAGCAGC	CUGAUGA	X	GAA	AUCCACUG	CAGUGGAUU	GCUGCUUC
	5937	UCCCCAAG	CUGAUGA	X	GAA	AGCAGCAA	UUGCUGCUU	CUUGGGGA
	5938	CUCCCCAA	CUGAUGA	X	GAA	AAGCAGCA	UGCUGCUUC	UUGGGGAG
10	5940	UUCUCCCC	CUGAUGA	X	GAA	AGAAGCAG	CUGCUUCUU	GGGGAGAA
	5953	AGGAAGCA	CUGAUGA	X	GAA	ACUCUUCU	AGAAGAGUA	UGCUUCCU
	5958	AUAAAAGG	CUGAUGA	X	GAA	AGCAUACU	AGUAUGCUU	CCUUUUAU
	5959	GAUAAAAG	CUGAUGA	X	GAA	AAGCAUAC	GUAUGCUUC	CUUUUAUC
	5962	AUGGAUAA	CUGAUGA	X	GAA	AGGAAGCA	UGCUUCCUU	UUAUCCAU
15	5963	CAUGGAUA	CUGAUGA	X	GAA	AAGGAAGC	GCUUCCUUU	UAUCCAUG
	5964	ACAUGGAU	CUGAUGA	X	GAA	AAAGGAAG	CUUCCUUUU	AUCCAUGU
	5965	UACAUGGA	CUGAUGA	X	GAA	AAAAGGAA	UUCCUUUUA	UCCAUGUA
	5967	AUUACAUG	CUGAUGA	X	GAA	AUAAAAGG	CCUUUUAUC	CAUGUAAU
	5973	AGUUAAAU	CUGAUGA	X	GAA	ACAUGGAU	AUCCAUGUA	AUUUAACU
20	5976	UACAGUUA	CUGAUGA	X	GAA	AUUACAUG	CAUGUAAUU	UAACUGUA
	5977	CUACAGUU	CUGAUGA	X	GAA	AAUUACAU	AUGUAAUUU	AACUGUAG
	5978	UCUACAGU	CUGAUGA	X	GAA	AAAUUACA	UGUAAUUUA	ACUGUAGA
	5984	UCAGGUUC	CUGAUGA	X	GAA	ACAGUUAA	UUAACUGUA	GAACCUGA
	5996	GUUACUUA	CUGAUGA	X	GAA	AGCUCAGG	CCUGAGCUC	UAAGUAAC
25	5998	CGGUUACU	CUGAUGA	X	GAA	AGAGCUCA	UGAGCUCUA	AGUAACCG
	6002	UCUUCGGU	CUGAUGA	X	GAA	ACUUAGAG	CUCUAAGUA	ACCGAAGA
	6015	CAGAGGCA	CUGAUGA	X	GAA	ACAUUCUU	AAGAAUGUA	UGCCUCUG
	6021	UAAGAACA	CUGAUGA	X	GAA	AGGCAUAC	GUAUGCCUC	UGUUCUUA
	6025	CACAUAAG	CUGAUGA	X	GAA	ACAGAGGC	GCCUCUGUU	CUUAUGUG
30	6026	GCACAUAA	CUGAUGA	X	GAA	AACAGAGG	CCUCUGUUC	UUAUGUGC
	6028	UGGCACAU	CUGAUGA	X	GAA	AGAACAGA	UCUGUUCUU	AUGUGCCA
	6029	GUGGCACA	CUGAUGA	X	GAA	AAGAACAG	CUGUUCUUA	UGUGCCAC
	6040	UAAACAAG	CUGAUGA	X	GAA	AUGUGGCA	UGCCACAUC	CUUGUUUA

	6043	CUUUAAAC	CUGAUGA	X	GAA	AGGAUGUG	CACAUCCUU	GUUUAAAG
	6046	AGCCUUUA	CUGAUGA	X	GAA	ACAAGGAU	AUCCUUGUU	UAAAGGCU
	6047	GAGCCUUU	CUGAUGA	X	GAA	AACAAGGA	UCCUUGUUU	AAAGGCUC
	6048	AGAGCCUU	CUGAUGA	X	GAA	AAACAAGG	CCUUGUUUA	AAGGCUCU
5	6055	CAUACAGA	CUGAUGA	X	GAA	AGCCUUUA	UAAAGGCUC	UCUGUAUG
	6057	UUCAUACA	CUGAUGA	X	GAA	AGAGCCUU	AAGGCUCUC	UGUAUGAA
	6061	UCUCUUCA	CUGAUGA	X	GAA	ACAGAGAG	CUCUCUGUA	UGAAGAGA
	6079	GUGCUGAU	CUGAUGA	X	GAA	ACGGUCCC	GGGACCGUC	AUCAGCAC
	6082	AAUGUGCU	CUGAUGA	X	GAA	AUGACGGU	ACCGUCAUC	AGCACAUU
10	6090	CACUAGGG	CUGAUGA	X	GAA	AUGUGCUG	CAGCACAUU	CCCUAGUG
	6091	UCACUAGG	CUGAUGA	X	GAA	AAUGUGCU	AGCACAUUC	CCUAGUGA
	6095	AGGCUCAC	CUGAUGA	X	GAA	AGGGAAUG	CAUUCCCUA	GUGAGCCU
	6104	GGAGCCAG	CUGAUGA	X	GAA	AGGCUCAC	GUGAGCCUA	CUGGCUCC
	6111	GCUGCCAG	CUGAUGA	X	GAA	AGCCAGUA	UACUGGCUC	CUGGCAGC
15	6124	UUCCACAA	CUGAUGA	X	GAA	AGCCGCUG	CAGCGGCUU	UUGUGGAA
	6125	CUUCCACA	CUGAUGA	X	GAA	AAGCCGCU	AGCGGCUUU	UGUGGAAG
	6126	UCUUCCAC	CUGAUGA	X	GAA	AAAGCCGC	GCGGCUUUU	GUGGAAGA
	6137	UGGCUAGU	CUGAUGA	X	GAA	AGUCUUCC	GGAAGACUC	ACUAGCCA
	6141	CUUCUGGC	CUGAUGA	X	GAA	AGUGAGUC	GACUCACUA	GCCAGAAG
20	6166	GUGGAGAG	CUGAUGA	X	GAA	ACUGUCCC	GGGACAGUC	CUCUCCAC
	6169	UUGGUGGA	CUGAUGA	X	GAA	AGGACUGU	ACAGUCCUC	UCCACCAA
	6171	UCUUGGUG	CUGAUGA	X	GAA	AGAGGACU	AGUCCUCUC	CACCAAGA
	6181	UGGAUUUA	CUGAUGA	X	GAA	AUCUUGGU	ACCAAGAUC	UAAAUCCA
	6183	UUUGGAUU	CUGAUGA	X	GAA	AGAUCUUG	CAAGAUCUA	AAUCCAAA
25	6187	UUUGUUUG	CUGAUGA	X	GAA	AUUUAGAU	AUCUAAAUC	CAAACAAA
	6204	UCUGGCUC	CUGAUGA	X	GAA	AGCCUGCU	AGCAGGCUA	GAGCCAGA
	6226	ACAACAAA	CUGAUGA	X	GAA	AUUUGUCC	GGACAAAUC	UUUGUUGU
	6228	GAACAACA	CUGAUGA	X	GAA	AGAUUUGU	ACAAAUCUU	UGUUGUUC
	6229	GGAACAAC	CUGAUGA	X	GAA	AAGAUUUG	CAAAUCUUU	GUUGUUCC
30	6232	AGAGGAAC	CUGAUGA	X	GAA	ACAAAGAU	AUCUUUGUU	GUUCCUCU
	6235	AGAAGAGG	CUGAUGA	X	GAA	ACAACAAA	UUUGUUGUU	CCUCUUCU
	6236	AAGAAGAG	CUGAUGA	X	GAA	AACAACAA	UUGUUGUUC	CUCUUCUU
	6239	GUAAAGAA	CUGAUGA	X	GAA	AGGAACAA	UUGUUCCUC	UUCUUUAC

	6241	GUGUAAAG	CUGAUGA	X	GAA	AGAGGAAC	GUUCCUCUU	CUUUACAC
	6242	UGUGUAAA	CUGAUGA	X	GAA	AAGAGGAA	UUCCUCUUC	UUUACACA
	6244	UAUGUGUA	CUGAUGA	X	GAA	AGAAGAGG	CCUCUUCUU	UACACAUA
	6245	GUAUGUGU	CUGAUGA	X	GAA	AAGAAGAG	CUCUUCUUU	ACACAUAC
5	6246	CGUAUGUG	CUGAUGA	X	GAA	AAAGAAGA	UCUUCUUUA	CACAUACG
	6252	GGUUUGCG	CUGAUGA	X	GAA	AUGUGUAA	UUACACAUA	CGCAAACC
	6280	AUUUAUAA	CUGAUGA	X	GAA	AUUGCCAG	CUGGCAAUU	UUAUAAAU
	6281	GAUUUAUA	CUGAUGA	X	GAA	AAUUGCCA	UGGCAAUUU	UAUAAAUC
	6282	UGAUUUAU	CUGAUGA	X	GAA	AAAUUGCC	GGCAAUUUU	AUAAAUCA
10	6283	CUGAUUUA	CUGAUGA	X	GAA	AAAAUUGC	GCAAUUUUA	UAAAUCAG
	6285	ACCUGAUU	CUGAUGA	X	GAA	AUAAAAUU	AAUUUUAUA	AAUCAGGU
	6289	AGUUACCU	CUGAUGA	X	GAA	AUUUAUAA	UUAUAAAUC	AGGUAACU
	6294	CUUCCAGU	CUGAUGA	X	GAA	ACCUGAUU	AAUCAGGUA	ACUGGAAG
	6308	CUGAGUUU	CUGAUGA	X	GAA	ACCUCCUU	AAGGAGGUU	AAACUCAG
15	6309	UCUGAGUU	CUGAUGA	X	GAA	AACCUCCU	AGGAGGUUA	AACUCAGA
	6314	UUUUUUCU	CUGAUGA	X	GAA	AGUUUAAC	GUUAAACUC	AGAAAAAA
	6331	AAUUGACU	CUGAUGA	X	GAA	AGGUCUUC	GAAGACCUC	AGUCAAUU
	6335	AGAGAAUU	CUGAUGA	X	GAA	ACUGAGGU	ACCUCAGUC	AAUUCUCU
	6339	AAGUAGAG	CUGAUGA	X	GAA	AUUGACUG	CAGUCAAUU	CUCUACUU
20	6340	AAAGUAGA	CUGAUGA	X	GAA	AAUUGACU	AGUCAAUUC	UCUACUUU
	6342	AAAAAGUA	CUGAUGA	X	GAA	AGAAUUGA	UCAAUUCUC	UACUUUUU
	6344	AAAAAAAG	CUGAUGA	X	GAA	AGAGAAUU	AAUUCUCUA	CUUUUUUU
	6347	AAAAAAAA	CUGAUGA	X	GAA	AGUAGAGA	UCUCUACUU	UUUUUUUU
	6348	AAAAAAAA	CUGAUGA	X	GAA	AAGUAGAG	CUCUACUUU	UUUUUUUU
25	6349	AAAAAAAA	CUGAUGA	X	GAA	AAAGUAGA	UCUACUUUU	UUUUUUUU
	6350	AAAAAAAA	CUGAUGA	X	GAA	AAAAGUAG	CUACUUUUU	UUUUUUUU
	6351	AAAAAAAA	CUGAUGA	X	GAA	AAAAAGUA	UACUUUUUU	UUUUUUUU
	6352	AAAAAAAA	CUGAUGA	X	GAA	AAAAAAGU	ACUUUUUUU	UUUUUUUU
	6353	AAAAAAAA	CUGAUGA	X	GAA	AAAAAAAG	CUUUUUUUU	UUUUUUUU
30	6354	GAAAAAAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUUUUUUC
	6355	GGAAAAAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUUUUUCC
	6356	UGGAAAAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUUUUCCA
	6357	UUGGAAAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUUUCCAA

	6358	UUUGGAAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUUCCAAA
	6359	AUUUGGAA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UUCCAAAU
	6360	GAUUUGGA	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	UCCAAAUC
	6361	UGAUUUGG	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUU	CCAAAUCA
5	6362	CUGAUUUG	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUC	CAAAUCAG
	6368	UAUUAUCU	CUGAUGA	X	GAA	AUUUGGAA	UUCCAAAUC	AGAUAAUA
	6373	UGGGCUAU	CUGAUGA	X	GAA	AUCUGAUU	AAUCAGAUA	AUAGCCCA
	6376	UGCUGGGC	CUGAUGA	X	GAA	AUUAUCUG	CAGAUAAUA	GCCCAGCA
	6388	GUUAUCAC	CUGAUGA	X	GAA	AUUUGCUG	CAGCAAAUA	GUGAUAAC
10	6394	UUAUUUGU	CUGAUGA	X	GAA	AUCACUAU	AUAGUGAUA	ACAAAUAA
	6401	UAAGGUUU	CUGAUGA	X	GAA	AUUUGUUA	UAACAAAUA	AAACCUUA
	6408	GAACAGCU	CUGAUGA	X	GAA	AGGUUUUA	UAAAACCUU	AGCUGUUC
	6409	UGAACAGC	CUGAUGA	X	GAA	AAGGUUUU	AAAACCUUA	GCUGUUCA
	6415	AAGACAUG	CUGAUGA	X	GAA	ACAGCUAA	UUAGCUGUU	CAUGUCUU
15	6416	CAAGACAU	CUGAUGA	X	GAA	AACAGCUA	UAGCUGUUC	AUGUCUUG
	6421	GAAAUCAA	CUGAUGA	X	GAA	ACAUGAAC	GUUCAUGUC	UUGAUUUC
	6423	UUGAAAUC	CUGAUGA	X	GAA	AGACAUGA	UCAUGUCUU	GAUUUCAA
	6427	AUUAUUGA	CUGAUGA	X	GAA	AUCAAGAC	GUCUUGAUU	UCAAUAAU
	6428	AAUUAUUG	CUGAUGA	X	GAA	AAUCAAGA	UCUUGAUUU	CAAUAAUU
20	6429	UAAUUAUU	CUGAUGA	X	GAA	AAAUCAAG	CUUGAUUUC	AAUAAUUA
	6433	GAAUUAAU	CUGAUGA	X	GAA	AUUGAAAU	AUUUCAAUA	AUUAAUUC
	6436	UAAGAAUU	CUGAUGA	X	GAA	AUUAUUGA	UCAAUAAUU	AAUUCUUA
	6437	UUAAGAAU	CUGAUGA	X	GAA	AAUUAUUG	CAAUAAUUA	AUUCUUAA
	6440	UGAUUAAG	CUGAUGA	X	GAA	AUUAAUUA	UAAUUAAUU	CUUAAUCA
25	6441	AUGAUUAA	CUGAUGA	X	GAA	AAUUAAUU	AAUUAAUUC	UUAAUCAU
	6443	UAAUGAUU	CUGAUGA	X	GAA	AGAAUUAA	UUAAUUCUU	AAUCAUUA
	6444	UUAAUGAU	CUGAUGA	X	GAA	AAGAAUUA	UAAUUCUUA	AUCAUUAA
	6447	CUCUUAAU	CUGAUGA	X	GAA	AUUAAGAA	UUCUUAAUC	AUUAAGAG
	6450	GGUCUCUU	CUGAUGA	X	GAA	AUGAUUAA	UUAAUCAUU	AAGAGACC
30	6451	UGGUCUCU	CUGAUGA	X	GAA	AAUGAUUA	UAAUCAUUA	AGAGACCA
	6461	GUAUUUAU	CUGAUGA	X	GAA	AUGGUCUC	GAGACCAUA	AUAAAUAC
	6464	GGAGUAUU	CUGAUGA	X	GAA	AUUAUGGU	ACCAUAAUA	AAUACUCC
	6468	AAAAGGAG	CUGAUGA	X	GAA	AUUUAUUA	UAAUAAAUA	CUCCUUUU

	6471	UUGAAAAG	CUGAUGA	X	GAA	AGUAUUUA	UAAAUACUC	CUUUUCAA
	6474	CUCUUGAA	CUGAUGA	X	GAA	AGGAGUAU	AUACUCCUU	UUCAAGAG
	6475	UCUCUUGA	CUGAUGA	X	GAA	AAGGAGUA	UACUCCUUU	UCAAGAGA
	6476	UUCUCUUG	CUGAUGA	X	GAA	AAAGGAGU	ACUCCUUUU	CAAGAGAA
5	6477	UUUCUCUU	CUGAUGA	X	GAA	AAAAGGAG	CUCCUUUUC	AAGAGAAA
	6497	ACAAUUCU	CUGAUGA	X	GAA	AUGGUUUU	AAAACCAUU	AGAAUUGU
	6498	AACAAUUC	CUGAUGA	X	GAA	AAUGGUUU	AAACCAUUA	GAAUUGUU
	6503	UGAGUAAC	CUGAUGA	X	GAA	AUUCUAAU	AUUAGAAUU	GUUACUCA
	6506	AGCUGAGU	CUGAUGA	X	GAA	ACAAUUCU	AGAAUUGUU	ACUCAGCU
10	6507	GAGCUGAG	CUGAUGA	X	GAA	AACAAUUC	GAAUUGUUA	CUCAGCUC
	6510	AAGGAGCU	CUGAUGA	X	GAA	AGUAACAA	UUGUUACUC	AGCUCCUU
	6515	GUUUGAAG	CUGAUGA	X	GAA	AGCUGAGU	ACUCAGCUC	CUUCAAAC
	6518	UGAGUUUG	CUGAUGA	X	GAA	AGGAGCUG	CAGCUCCUU	CAAACUCA
	6519	CUGAGUUU	CUGAUGA	X	GAA	AAGGAGCU	AGCUCCUUC	AAACUCAG
15	6525	ACAAACCU	CUGAUGA	X	GAA	AGUUUGAA	UUCAAACUC	AGGUUUGU
	6530	AUGCUACA	CUGAUGA	X	GAA	ACCUGAGU	ACUCAGGUU	UGUAGCAU
	6531	UAUGCUAC	CUGAUGA	X	GAA	AACCUGAG	CUCAGGUUU	GUAGCAUA
	6534	AUGUAUGC	CUGAUGA	X	GAA	ACAAACCU	AGGUUUGUA	GCAUACAU
	6539	GACUCAUG	CUGAUGA	X	GAA	AUGCUACA	UGUAGCAUA	CAUGAGUC
20	6547	GAUGGAUG	CUGAUGA	X	GAA	ACUCAUGU	ACAUGAGUC	CAUCCAUC
	6551	GACUGAUG	CUGAUGA	X	GAA	AUGGACUC	GAGUCCAUC	CAUCAGUC
	6555	CUUUGACU	CUGAUGA	X	GAA	AUGGAUGG	CCAUCCAUC	AGUCAAAG
	6559	CAUUCUUU	CUGAUGA	X	GAA	ACUGAUGG	CCAUCAGUC	AAAGAAUG
	6570	CCAGAUGG	CUGAUGA	X	GAA	ACCAUUCU	AGAAUGGUU	CCAUCUGG
25	6571	UCCAGAUG	CUGAUGA	X	GAA	AACCAUUC	GAAUGGUUC	CAUCUGGA
	6575	AGACUCCA	CUGAUGA	X	GAA	AUGGAACC	GGUUCCAUC	UGGAGUCU
	6582	UACAUUAA	CUGAUGA	X	GAA	ACUCCAGA	UCUGGAGUC	UUAAUGUA
	6584	UCUACAUU	CUGAUGA	X	GAA	AGACUCCA	UGGAGUCUU	AAUGUAGA
	6585	UUCUACAU	CUGAUGA	X	GAA	AAGACUCC	GGAGUCUUA	AUGUAGAA
30	6590	UUUCUUUC	CUGAUGA	X	GAA	ACAUUAAG	CUUAAUGUA	GAAAGAAA
	6609	AUUAUUAC	CUGAUGA	X	GAA	AGUCUCCA	UGGAGACUU	GUAAUAAU
	6612	CUCAUUAU	CUGAUGA	X	GAA	ACAAGUCU	AGACUUGUA	AUAAUGAG
	6615	UAGCUCAU	CUGAUGA	X	GAA	AUUACAAG	CUUGUAAUA	AUGAGCUA

	6623	UUUGUAAC	CUGAUGA	X	GAA	AGCUCAUU	AAUGAGCUA	GUUACAAA
	6626	CACUUUGU	CUGAUGA	X	GAA	ACUAGCUC	GAGCUAGUU	ACAAAGUG
	6627	GCACUUUG	CUGAUGA	X	GAA	AACUAGCU	AGCUAGUUA	CAAAGUGC
	6637	UAAUGAAC	CUGAUGA	X	GAA	AGCACUUU	AAAGUGCUU	GUUCAUUA
5	6640	UUUUAAUG	CUGAUGA	X	GAA	ACAAGCAC	GUGCUUGUU	CAUUAAAA
	6641	AUUUUAAU	CUGAUGA	X	GAA	AACAAGCA	UGCUUGUUC	AUUAAAAU
	6644	GCUAUUUU	CUGAUGA	X	GAA	AUGAACAA	UUGUUCAUU	AAAAUAGC
	6645	UGCUAUUU	CUGAUGA	X	GAA	AAUGAACA	UGUUCAUUA	AAAUAGCA
	6650	UUCAGUGC	CUGAUGA	X	GAA	AUUUUAAU	AUUAAAAUA	GCACUGAA
10	6662	CAUGUUUC	CUGAUGA	X	GAA	AUUUUCAG	CUGAAAAUU	GAAACAUG
	6674	UAUCAGUU	CUGAUGA	X	GAA	AUUCAUGU	ACAUGAAUU	AACUGAUA
	6675	UUAUCAGU	CUGAUGA	X	GAA	AAUUCAUG	CAUGAAUUA	ACUGAUAA
	6682	UGGAAUAU	CUGAUGA	X	GAA	AUCAGUUA	UAACUGAUA	AUAUUCCA
	6685	GAUUGGAA	CUGAUGA	X	GAA	AUUAUCAG	CUGAUAAUA	UUCCAAUC
15	6687	AUGAUUGG	CUGAUGA	X	GAA	AUAUUAUC	GAUAAUAUU	CCAAUCAU
	6688	AAUGAUUG	CUGAUGA	X	GAA	AAUAUUAU	AUAAUAUUC	CAAUCAUU
	6693	UGGCAAAU	CUGAUGA	X	GAA	AUUGGAAU	AUUCCAAUC	AUUUGCCA
	6696	AAAUGGCA	CUGAUGA	X	GAA	AUGAUUGG	CCAAUCAUU	UGCCAUUU
	6697	UAAAUGGC	CUGAUGA	X	GAA	AAUGAUUG	CAAUCAUUU	GCCAUUUA
20	6703	UUGUCAUA	CUGAUGA	X	GAA	AUGGCAAA	UUUGCCAUU	UAUGACAA
	6704	UUUGUCAU	CUGAUGA	X	GAA	AAUGGCAA	UUGCCAUUU	AUGACAAA
	6705	UUUUGUCA	CUGAUGA	X	GAA	AAAUGGCA	UGCCAUUUA	UGACAAAA
	6719	UUAGUGCC	CUGAUGA	X	GAA	ACCAUUUU	AAAAUGGUU	GGCACUAA
	6726	UUCUUUGU	CUGAUGA	X	GAA	AGUGCCAA	UUGGCACUA	ACAAAGAA
25	6743	CUGAAAGG	CUGAUGA	X	GAA	AGUGCUCG	CGAGCACUU	CCUUUCAG
	6744	UCUGAAAG	CUGAUGA	X	GAA	AAGUGCUC	GAGCACUUC	CUUUCAGA
	6747	AACUCUGA	CUGAUGA	X	GAA	AGGAAGUG	CACUUCCUU	UCAGAGUU
	6748	AAACUCUG	CUGAUGA	X	GAA	AAGGAAGU	ACUUCCUUU	CAGAGUUU
	6749	GAAACUCU	CUGAUGA	X	GAA	AAAGGAAG	CUUCCUUUC	AGAGUUUC
30	6755	AUCUCAGA	CUGAUGA	X	GAA	ACUCUGAA	UUCAGAGUU	UCUGAGAU
	6756	UAUCUCAG	CUGAUGA	X	GAA	AACUCUGA	UCAGAGUUU	CUGAGAUA
	6757	UUAUCUCA	CUGAUGA	X	GAA	AAACUCUG	CAGAGUUUC	UGAGAUAA
	6764	ACGUACAU	CUGAUGA	X	GAA	AUCUCAGA	UCUGAGAUA	AUGUACGU

	6769	GUUCCACG	CUGAUGA	X	GAA	ACAUUAUC	GAUAAUGUA	CGUGGAAC
	6781	UCCACCCA	CUGAUGA	X	GAA	ACUGUUCC	GGAACAGUC	UGGGUGGA
	6814	AAGACACA	CUGAUGA	X	GAA	ACUUGCAC	GUGCAAGUC	UGUGUCUU
	6820	ACUGACAA	CUGAUGA	X	GAA	ACACAGAC	GUCUGUGUC	UUGUCAGU
5	6822	GGACUGAC	CUGAUGA	X	GAA	AGACACAG	CUGUGUCUU	GUCAGUCC
	6825	CUUGGACU	CUGAUGA	X	GAA	ACAAGACA	UGUCUUGUC	AGUCCAAG
	6829	ACUUCUUG	CUGAUGA	X	GAA	ACUGACAA	UUGUCAGUC	CAAGAAGU
	6851	CUAAAAUU	CUGAUGA	X	GAA	ACAUCUCG	CGAGAUGUU	AAUUUUAG
	6852	CCUAAAAU	CUGAUGA	X	GAA	AACAUCUC	GAGAUGUUA	AUUUUAGG
10	6855	GUCCCUAA	CUGAUGA	X	GAA	AUUAACAU	AUGUUAAUU	UUAGGGAC
	6856	GGUCCCUA	CUGAUGA	X	GAA	AAUUAACA	UGUUAAUUU	UAGGGACC
	6857	GGGUCCCU	CUGAUGA	X	GAA	AAAUUAAC	GUUAAUUUU	AGGGACCC
	6858	CGGGUCCC	CUGAUGA	X	GAA	AAAAUUAA	UUAAUUUUA	GGGACCCG
	6872	UAGGAAAC	CUGAUGA	X	GAA	AGGCACGG	CCGUGCCUU	GUUUCCUA
15	6875	GGCUAGGA	CUGAUGA	X	GAA	ACAAGGCA	UGCCUUGUU	UCCUAGCC
	6876	GGGCUAGG	CUGAUGA	X	GAA	AACAAGGC	GCCUUGUUU	CCUAGCCC
	6877	UGGGCUAG	CUGAUGA	X	GAA	AAACAAGG	CCUUGUUUC	CUAGCCCA
	6880	UUGUGGGC	CUGAUGA	X	GAA	AGGAAACA	UGUUUCCUA	GCCCACAA
	6901	AUCUGUUU	CUGAUGA	X	GAA	AUGUUUGC	GCAAACAUC	AAACAGAU
20	6910	CUAGCGAG	CUGAUGA	X	GAA	AUCUGUUU	AAACAGAUA	CUCGCUAG
	6913	AGGCUAGC	CUGAUGA	X	GAA	AGUAUCUG	CAGAUACUC	GCUAGCCU
	6917	AAUGAGGC	CUGAUGA	X	GAA	AGCGAGUA	UACUCGCUA	GCCUCAUU
	6922	AUUUAAAU	CUGAUGA	X	GAA	AGGCUAGC	GCUAGCCUC	AUUUAAAU
	6925	UCAAUUUA	CUGAUGA	X	GAA	AUGAGGCU	AGCCUCAUU	UAAAUUGA
25	6926	AUCAAUUU	CUGAUGA	X	GAA	AAUGAGGC	GCCUCAUUU	AAAUUGAU
	6927	AAUCAAUU	CUGAUGA	X	GAA	AAAUGAGG	CCUCAUUUA	AAUUGAUU
	6931	CUUUAAUC	CUGAUGA	X	GAA	AUUUAAAU	AUUUAAAUU	GAUUAAAG
	6935	CCUCCUUU	CUGAUGA	X	GAA	AUCAAUUU	AAAUUGAUU	AAAGGAGG
	6936	UCCUCCUU	CUGAUGA	X	GAA	AAUCAAUU	AAUUGAUUA	AAGGAGGA
30	6951	CGGCCAAA	CUGAUGA	X	GAA	AUGCACUC	GAGUGCAUC	UUUGGCCG
	6953	GUCGGCCA	CUGAUGA	X	GAA	AGAUGCAC	GUGCAUCUU	UGGCCGAC
	6954	UGUCGGCC	CUGAUGA	X	GAA	AAGAUGCA	UGCAUCUUU	GGCCGACA
	6970	CACACAGU	CUGAUGA	X	GAA	ACACCACU	AGUGGUGUA	ACUGUGUG

7026	AACACACA CUGAUGA X GAA	ACACCCAC	GUGGGUGUA UGUGUGUU
7034	AUGCACAA CUGAUGA X GAA	ACACACAU	AUGUGUGUU UUGUGCAU
7035	UAUGCACA CUGAUGA X GAA	AACACACA	UGUGUGUUU UGUGCAUA
7036	UUAUGCAC CUGAUGA X GAA	AAACACAC	GUGUGUUUU GUGCAUAA
7043	UAAAUAGU CUGAUGA X GAA	AUGCACAA	UUGUGCAUA ACUAUUUA
7047	UCCUUAAA CUGAUGA X GAA	AGUUAUGC	GCAUAACUA UUUAAGGA
7049	UUUCCUUA CUGAUGA X GAA	AUAGUUAU	AUAACUAUU UAAGGAAA
7050	GUUUCCUU CUGAUGA X GAA	AAUAGUUA	UAACUAUUU AAGGAAAC
7051	AGUUUCCU CUGAUGA X GAA	AAAUAGUU	AACUAUUUA AGGAAACU
7065	AACUUUAA CUGAUGA X GAA	AUUCCAGU	ACUGGAAUU UUAAAGUU
7066	UAACUUUA CUGAUGA X GAA	AAUUCCAG	CUGGAAUUU UAAAGUUA
7067	GUAACUUU CUGAUGA X GAA	AAAUUCCA	UGGAAUUUU AAAGUUAC
7068	AGUAACUU CUGAUGA X GAA	AAAAUUCC	GGAAUUUUA AAGUUACU
7073	AUAAAAGU CUGAUGA X GAA	ACUUUAAA	UUUAAAGUU ACUUUUAU
7074	UAUAAAAG CUGAUGA X GAA	AACUUUAA	UUAAAGUUA CUUUUAUA
7077	UUGUAUAA CUGAUGA X GAA	AGUAACUU	AAGUUACUU UUAUACAA
7078	UUUGUAUA CUGAUGA X GAA	AAGUAACU	AGUUACUUU UAUACAAA
7079	GUUUGUAU CUGAUGA X GAA	AAAGUAAC	GUUACUUUU AUACAAAC
7080	GGUUUGUA CUGAUGA X GAA	AAAAGUAA	UUACUUUUA UACAAACC
7082	UUGGUUUG CUGAUGA X GAA	AUAAAAGU	ACUUUUAUA CAAACCAA
7095	GUAGCAUA CUGAUGA X GAA	AUUCUUGG	CCAAGAAUA UAUGCUAC
7097	CUGUAGCA CUGAUGA X GAA	AUAUUCUU	AAGAAUAUA UGCUACAG
7102	UAUAUCUG CUGAUGA X GAA	AGCAUAUA	UAUAUGCUA CAGAUAUA
7108	CUGUCUUA CUGAUGA X GAA	AUCUGUAG	CUACAGAUA UAAGACAG
7110	GUCUGUCU CUGAUGA X GAA	AUAUCUGU	ACAGAUAUA AGACAGAC
7124	UAGGACCA CUGAUGA X GAA	ACCAUGUC	GACAUGGUU UGGUCCUA
7125	AUAGGACC CUGAUGA X GAA	AACCAUGU	ACAUGGUUU GGUCCUAU
7129	AAAUAUAG CUGAUGA X GAA	ACCAAACC	GGUUUGGUC CUAUAUUU
7132	UAGAAAUA CUGAUGA X GAA	AGGACCAA	UUGGUCCUA UAUUUCUA
7134	ACUAGAAA CUGAUGA X GAA	AUAGGACC	GGUCCUAUA UUUCUAGU
7136	UGACUAGA CUGAUGA X GAA	AUAUAGGA	UCCUAUAUU UCUAGUCA
7137	AUGACUAG CUGAUGA X GAA	AAUAUAGG	CCUAUAUUU CUAGUCAU
7138	CAUGACUA CUGAUGA X GAA	AAAUAUAG	CUAUAUUUC UAGUCAUG

	7140	AUCAUGAC	CUGAUGA	X	GAA	AGAAAUAU	AUAUUUCUA	GUCAUGAU
	7143	UUCAUCAU	CUGAUGA	X	GAA	ACUAGAAA	UUUCUAGUC	AUGAUGAA
	7155	AUACAAAA	CUGAUGA	X	GAA	ACAUUCAU	AUGAAUGUA	UUUUGUAU
	7157	GUAUACAA	CUGAUGA	X	GAA	AUACAUUC	GAAUGUAUU	UUGUAUAC
5	7158	GGUAUACA	CUGAUGA	X	GAA	AAUACAUU	AAUGUAUUU	UGUAUACC
	7159	UGGUAUAC	CUGAUGA	X	GAA	AAAUACAU	AUGUAUUUU	GUAUACCA
	7162	AGAUGGUA	CUGAUGA	X	GAA	ACAAAAUA	UAUUUUGUA	UACCAUCU
	7164	GAAGAUGG	CUGAUGA	X	GAA	AUACAAAA	UUUUGUAUA	CCAUCUUC
	7169	UAUAUGAA	CUGAUGA	X	GAA	AUGGUAUA	UAUACCAUC	UUCAUAUA
10	7171	AUUAUAUG	CUGAUGA	X	GAA	AGAUGGUA	UACCAUCUU	CAUAUAAU
	7172	UAUUAUAU	CUGAUGA	X	GAA	AAGAUGGU	ACCAUCUUC	AUAUAAUA
	7175	GUAUAUUA	CUGAUGA	X	GAA	AUGAAGAU	AUCUUCAUA	UAAUAUAC
	7177	AAGUAUAU	CUGAUGA	X	GAA	AUAUGAAG	CUUCAUAUA	AUAUACUU
	7180	UUUAAGUA	CUGAUGA	X	GAA	AUUAUAUG	CAUAUAAUA	UACUUAAA
15	7182	UUUUUAAG	CUGAUGA	X	GAA	AUAUUAUA	UAUAAUAUA	CUUAAAAA
	7185	AUAUUUUU	CUGAUGA	X	GAA	AGUAUAUU	AAUAUACUU	AAAAAUAU
	7186	AAUAUUUU	CUGAUGA	X	GAA	AAGUAUAU	AUAUACUUA	AAAAUAUU
	7192	UUAAGAAA	CUGAUGA	X	GAA	AUUUUUAA	UUAAAAAUA	UUUCUUAA
	7194	AAUUAAGA	CUGAUGA	X	GAA	AUAUUUUU	AAAAAUAUU	UCUUAAUU
20	7195	CAAUUAAG	CUGAUGA	X	GAA	AAUAUUUU	AAAAUAUUU	CUUAAUUG
	7196	CCAAUUAA	CUGAUGA	X	GAA	AAAUAUUU	AAAUAUUUC	UUAAUUGG
	7198	UCCCAAUU	CUGAUGA	X	GAA	AGAAAUAU	AUAUUUCUU	AAUUGGGA
	7199	AUCCCAAU	CUGAUGA	X	GAA	AAGAAAUA	UAUUUCUUA	AUUGGGAU
	7202	CAAAUCCC	CUGAUGA	X	GAA	AUUAAGAA	UUCUUAAUU	GGGAUUUG
25	7208	CGAUUACA	CUGAUGA	X	GAA	AUCCCAAU	AUUGGGAUU	UGUAAUCG
	7209	ACGAUUAC	CUGAUGA	X	GAA	AAUCCCAA	UUGGGAUUU	GUAAUCGU
	7212	GGUACGAU	CUGAUGA	X	GAA	ACAAAUCC	GGAUUUGUA	AUCGUACC
	7215	GUUGGUAC	CUGAUGA	X	GAA	AUUACAAA	UUUGUAAUC	GUACCAAC
	7218	UAAGUUGG	CUGAUGA	X	GAA	ACGAUUAC	GUAAUCGUA	CCAACUUA
30	7225	UAUCAAUU	CUGAUGA	X	GAA	AGUUGGUA	UACCAACUU	AAUUGAUA
	7226	UUAUCAAU	CUGAUGA	X	GAA	AAGUUGGU	ACCAACUUA	AUUGAUAA
	7229	AGUUUAUC	CUGAUGA	X	GAA	AUUAAGUU	AACUUAAUU	GAUAAACU
	7233	GCCAAGUU	CUGAUGA	X	GAA	AUCAAUUA	UAAUUGAUA	AACUUGGC

	7238	CAGUUGCC	CUGAUGA	X	GAA	AGUUUAUC	GAUAAACUU	GGCAACUG
	7249	GAACAUAA	CUGAUGA	X	GAA	AGCAGUUG	CAACUGCUU	UUAUGUUC
	7250	AGAACAUA	CUGAUGA	X	GAA	AAGCAGUU	AACUGCUUU	UAUGUUCU
	7251	CAGAACAU	CUGAUGA	X	GAA	AAAGCAGU	ACUGCUUUU	AUGUUCUG
5	7252	ACAGAACA	CUGAUGA	X	GAA	AAAAGCAG	CUGCUUUUA	UGUUCUGU
	7256	GGAGACAG	CUGAUGA	X	GAA	ACAUAAAA	UUUUAUGUU	CUGUCUCC
	7257	AGGAGACA	CUGAUGA	X	GAA	AACAUAAA	UUUAUGUUC	UGUCUCCU
	7261	UGGAAGGA	CUGAUGA	X	GAA	ACAGAACA	UGUUCUGUC	UCCUUCCA
	7263	UAUGGAAG	CUGAUGA	X	GAA	AGACAGAA	UUCUGUCUC	CUUCCAUA
10	7266	AUUUAUGG	CUGAUGA	X	GAA	AGGAGACA	UGUCUCCUU	CCAUAAAU
	7267	AAUUUAUG	CUGAUGA	X	GAA	AAGGAGAC	GUCUCCUUC	CAUAAAUU
	7271	GAAAAAUU	CUGAUGA	X	GAA	AUGGAAGG	CCUUCCAUA	AAUUUUUC
	7275	UUUUGAAA	CUGAUGA	X	GAA	AUUUAUGG	CCAUAAAUU	UUUCAAAA
	7276	AUUUUGAA	CUGAUGA	X	GAA	AAUUUAUG	CAUAAAUUU	UUCAAAAU
15	7277	UAUUUUGA	CUGAUGA	X	GAA	AAAUUUAU	AUAAAUUUU	UCAAAAUA
	7278	GUAUUUUG	CUGAUGA	X	GAA	AAAAUUUA	UAAAUUUUU	CAAAAUAC
	7279	AGUAUUUU	CUGAUGA	X	GAA	AAAAAUUU	AAAUUUUUC	AAAAUACU
	7285	UGAAUUAG	CUGAUGA	X	GAA	AUUUUGAA	UUCAAAAUA	CUAAUUCA
	7288	UGUUGAAU	CUGAUGA	X	GAA	AGUAUUUU	AAAAUACUA	AUUCAACA
20	7291	CUUUGUUG	CUGAUGA	X	GAA	AUUAGUAU	AUACUAAUU	CAACAAAG
	7292	UCUUUGUU	CUGAUGA	X	GAA	AAUUAGUA	UACUAAUUC	AACAAAGA
	7308	AAAAAAAA	CUGAUGA	X	GAA	AGCUUUUU	AAAAAGCUC	UUUUUUUU
	7310	GGAAAAAA	CUGAUGA	X	GAA	AGAGCUUU	AAAGCUCUU	UUUUUUCC
	7311	AGGAAAAA	CUGAUGA	X	GAA	AAGAGCUU	AAGCUCUUU	UUUUUCCU
25	7312	UAGGAAAA	CUGAUGA	X	GAA	AAAGAGCU	AGCUCUUUU	UUUUCCUA
	7313	UUAGGAAA	CUGAUGA	X	GAA	AAAAGAGC	GCUCUUUUU	UUUCCUAA
	7314	UUUAGGAA	CUGAUGA	X	GAA	AAAAAGAG	CUCUUUUUU	UUCCUAAA
	7315	UUUUAGGA	CUGAUGA	X	GAA	AAAAAAGA	UCUUUUUUU	UCCUAAAA
	7316	AUUUUAGG	CUGAUGA	X	GAA	AAAAAAAG	CUUUUUUUU	CCUAAAAU
30	7317	UAUUUUAG	CUGAUGA	X	GAA	AAAAAAAA	UUUUUUUUC	CUAAAAUA
	7320	GUUUAUUU	CUGAUGA	X	GAA	AGGAAAAA	UUUUUCCUA	AAAUAAAC
	7325	UUUGAGUU	CUGAUGA	X	GAA	AUUUUAGG	CCUAAAAUA	AACUCAAA
	7330	AUAAAUUU	CUGAUGA	X	GAA	AGUUUAUU	AAUAAACUC	AAAUUUAU

	7335	CAAGGAUA	CUGAUGA	X	GAA	AUUUGAGU	ACUCAAAUU	UAUCCUUG
	7336	ACAAGGAU	CUGAUGA	X	GAA	AAUUUGAG	CUCAAAUUU	AUCCUUGU
	7337	AACAAGGA	CUGAUGA	X	GAA	AAAUUUGA	UCAAAUUUA	UCCUUGUU
	7339	UAAACAAG	CUGAUGA	X	GAA	AUAAAUUU	AAAUUUAUC	CUUGUUUA
5	7342	CUCUAAAC	CUGAUGA	X	GAA	AGGAUAAA	UUUAUCCUU	GUUUAGAG
	7345	CUGCUCUA	CUGAUGA	X	GAA	ACAAGGAU	AUCCUUGUU	UAGAGCAG
	7346	UCUGCUCU	CUGAUGA	X	GAA	AACAAGGA	UCCUUGUUU	AGAGCAGA
	7347	CUCUGCUC	CUGAUGA	X	GAA	AAACAAGG	CCUUGUUUA	GAGCAGAG
	7362	UUUUUCUU	CUGAUGA	X	GAA	AUUUUUCU	AGAAAAAUU	AAGAAAAA
10	7363	GUUUUUCU	CUGAUGA	X	GAA	AAUUUUUC	GAAAAAUUA	AGAAAAAC
	7373	CCAUUUCA	CUGAUGA	X	GAA	AGUUUUUC	GAAAAACUU	UGAAAUGG
	7374	ACCAUUUC	CUGAUGA	X	GAA	AAGUUUUU	AAAAACUUU	GAAAUGGU
	7383	UUUUUUGA	CUGAUGA	X	GAA	ACCAUUUC	GAAAUGGUC	UCAAAAAA
	7385	AAUUUUUU	CUGAUGA	X	GAA	AGACCAUU	AAUGGUCUC	AAAAAAUU
15	7393	UAUUUAGC	CUGAUGA	X	GAA	AUUUUUUG	CAAAAAAUU	GCUAAAUA
	7397	AAAAUAUU	CUGAUGA	X	GAA	AGCAAUUU	AAAUUGCUA	AAUAUUUU
	7401	AUUGAAAA	CUGAUGA	X	GAA	AUUUAGCA	UGCUAAAUA	UUUUCAAU
	7403	CCAUUGAA	CUGAUGA	X	GAA	AUAUUUAG	CUAAAUAUU	UUCAAUGG
	7404	UCCAUUGA	CUGAUGA	X	GAA	AAUAUUUA	UAAAUAUUU	UCAAUGGA
20	7405	UUCCAUUG	CUGAUGA	X	GAA	AAAUAUUU	AAAUAUUUU	CAAUGGAA
	7406	UUUCCAUU	CUGAUGA	X	GAA	AAAAUAUU	AAUAUUUUC	AAUGGAAA
	7418	CUAACAUU	CUGAUGA	X	GAA	AGUUUUCC	GGAAAACUA	AAUGUUAG
	7424	GCUAAACU	CUGAUGA	X	GAA	ACAUUUAG	CUAAAUGUU	AGUUUAGC
	7425	AGCUAAAC	CUGAUGA	X	GAA	AACAUUUA	UAAAUGUUA	GUUUAGCU
25	7428	AUCAGCUA	CUGAUGA	X	GAA	ACUAACAU	AUGUUAGUU	UAGCUGAU
	7429	AAUCAGCU	CUGAUGA	X	GAA	AACUAACA	UGUUAGUUU	AGCUGAUU
	7430	CAAUCAGC	CUGAUGA	X	GAA	AAACUAAC	GUUAGUUUA	GCUGAUUG
	7437	CCCCAUAC	CUGAUGA	X	GAA	AUCAGCUA	UAGCUGAUU	GUAUGGGG
	7440	AAACCCCA	CUGAUGA	X	GAA	ACAAUCAG	CUGAUUGUA	UGGGGUUU
30	7447	GGUUCGAA	CUGAUGA	X	GAA	ACCCCAUA	UAUGGGGUU	UUCGAACC
	7448	AGGUUCGA	CUGAUGA	X	GAA	AACCCCAU	AUGGGGUUU	UCGAACCU
	7449	AAGGUUCG	CUGAUGA	X	GAA	AAACCCCA	UGGGGUUUU	CGAACCUU
	7450	AAAGGUUC	CUGAUGA	X	GAA	AAAACCCC	GGGGUUUUC	GAACCUUU

	7457	AAAAGUGA	CUGAUGA	X	GAA	AGGUUCGA	UCGAACCUU	UCACUUUU
	7458	AAAAAGUG	CUGAUGA	X	GAA	AAGGUUCG	CGAACCUUU	CACUUUUU
	7459	CAAAAAGU	CUGAUGA	X	GAA	AAAGGUUC	GAACCUUUC	ACUUUUUG
	7463	CAAACAAA	CUGAUGA	X	GAA	AGUGAAAG	CUUUCACUU	UUUGUUUG
5	7464	ACAAACAA	CUGAUGA	X	GAA	AAGUGAAA	UUUCACUUU	UUGUUUGU
	7465	AACAAACA	CUGAUGA	X	GAA	AAAGUGAA	UUCACUUUU	UGUUUGUU
	7466	AAACAAAC	CUGAUGA	X	GAA	AAAAGUGA	UCACUUUUU	GUUUGUUU
	7469	GUAAAACA	CUGAUGA	X	GAA	ACAAAAAG	CUUUUUGUU	UGUUUUAC
	7470	GGUAAAAC	CUGAUGA	X	GAA	AACAAAAA	UUUUUGUUU	GUUUUACC
10	7473	AUAGGUAA	CUGAUGA	X	GAA	ACAAACAA	UUGUUUGUU	UUACCUAU
	7474	AAUAGGUA	CUGAUGA	X	GAA	AACAAACA	UGUUUGUUU	UACCUAUU
	7475	AAAUAGGU	CUGAUGA	X	GAA	AAACAAAC	GUUUGUUUU	ACCUAUUU
	7476	GAAAUAGG	CUGAUGA	X	GAA	AAAACAAA	UUUGUUUUA	CCUAUUUC
	7480	UUGUGAAA	CUGAUGA	X	GAA	AGGUAAAA	UUUUACCUA	UUUCACAA
15	7482	AGUUGUGA	CUGAUGA	X	GAA	AUAGGUAA	UUACCUAUU	UCACAACU
	7483	CAGUUGUG	CUGAUGA	X	GAA	AAUAGGUA	UACCUAUUU	CACAACUG
	7484	ACAGUUGU	CUGAUGA	X	GAA	AAAUAGGU	ACCUAUUUC	ACAACUGU
	7495	UGGCAAUU	CUGAUGA	X	GAA	ACACAGUU	AACUGUGUA	AAUUGCCA
	7499	UUAUUGGC	CUGAUGA	X	GAA	AUUUACAC	GUGUAAAUU	GCCAAUAA
20	7506	ACAGGAAU	CUGAUGA	X	GAA	AUUGGCAA	UUGCCAAUA	AUUCCUGU
	7509	UGGACAGG	CUGAUGA	X	GAA	AUUAUUGG	CCAAUAAUU	CCUGUCCA
	7510	AUGGACAG	CUGAUGA	X	GAA	AAUUAUUG	CAAUAAUUC	CUGUCCAU
	7515	UUUUCAUG	CUGAUGA	X	GAA	ACAGGAAU	AUUCCUGUC	CAUGAAAA
	7531	CACUGGAU	CUGAUGA	X	GAA	AUUUGCAU	AUGCAAAUU	AUCCAGUG
25	7532	ACACUGGA	CUGAUGA	X	GAA	AAUUUGCA	UGCAAAUUA	UCCAGUGU
	7534	CUACACUG	CUGAUGA	X	GAA	AUAAUUUG	CAAAUUAUC	CAGUGUAG
	7541	AAUAUAUC	CUGAUGA	X	GAA	ACACUGGA	UCCAGUGUA	GAUAUAUU
	7545	GUCAAAUA	CUGAUGA	X	GAA	AUCUACAC	GUGUAGAUA	UAUUUGAC
	7547	UGGUCAAA	CUGAUGA	X	GAA	AUAUCUAC	GUAGAUAUA	UUUGACCA
30	7549	GAUGGUCA	CUGAUGA	X	GAA	AUAUAUCU	AGAUAUAUU	UGACCAUC
	7550	UGAUGGUC	CUGAUGA	X	GAA	AAUAUAUC	GAUAUAUUU	GACCAUCA
	7557	CAUAGGGU	CUGAUGA	X	GAA	AUGGUCAA	UUGACCAUC	ACCCUAUG
	7563	AAUAUCCA	CUGAUGA	X	GAA	AGGGUGAU	AUCACCCUA	UGGAUAUU

	7569	CUAGCCAA	CUGAUGA	X	GAA	AUCCAUAG	CUAUGGAUA	UUGGCUAG
	7571	AACUAGCC	CUGAUGA	X	GAA	AUAUCCAU	AUGGAUAUU	GGCUAGUU
	7576	GGCAAAAC	CUGAUGA	X	GAA	AGCCAAUA	UAUUGGCUA	GUUUUGCC
	7579	AAAGGCAA	CUGAUGA	X	GAA	ACUAGCCA	UGGCUAGUU	UUGCCUUU
5	7580	UAAAGGCA	CUGAUGA	X	GAA	AACUAGCC	GGCUAGUUU	UGCCUUUA
	7581	AUAAAGGC	CUGAUGA	X	GAA	AAACUAGC	GCUAGUUUU	GCCUUUAU
	7586	GCUUAAUA	CUGAUGA	X	GAA	AGGCAAAA	UUUUGCCUU	UAUUAAGC
	7587	UGCUUAAU	CUGAUGA	X	GAA	AAGGCAAA	UUUGCCUUU	AUUAAGCA
	7588	UUGCUUAA	CUGAUGA	X	GAA	AAAGGCAA	UUGCCUUUA	UUAAGCAA
10	7590	AUUUGCUU	CUGAUGA	X	GAA	AUAAAGGC	GCCUUUAUU	AAGCAAAU
	7591	AAUUUGCU	CUGAUGA	X	GAA	AAUAAAGG	CCUUUAUUA	AGCAAAUU
	7599	CUGAAAUG	CUGAUGA	X	GAA	AUUUGCUU	AAGCAAAUU	CAUUUCAG
	7600	GCUGAAAU	CUGAUGA	X	GAA	AAUUUGCU	AGCAAAUUC	AUUUCAGC
	7603	CAGGCUGA	CUGAUGA	X	GAA	AUGAAUUU	AAAUUCAUU	UCAGCCUG
15	7604	UCAGGCUG	CUGAUGA	X	GAA	AAUGAAUU	AAUUCAUUU	CAGCCUGA
	7605	UUCAGGCU	CUGAUGA	X	GAA	AAAUGAAU	AUUCAUUUC	AGCCUGAA
	7617	UAUAGGCA	CUGAUGA	X	GAA	ACAUUCAG	CUGAAUGUC	UGCCUAUA
	7623	AGAAUAUA	CUGAUGA	X	GAA	AGGCAGAC	GUCUGCCUA	UAUAUUCU
	7625	AGAGAAUA	CUGAUGA	X	GAA	AUAGGCAG	CUGCCUAUA	UAUUCUCU
20	7627	GCAGAGAA	CUGAUGA	X	GAA	AUAUAGGC	GCCUAUAUA	UUCUCUGC
	7629	GAGCAGAG	CUGAUGA	X	GAA	AUAUAUAG	CUAUAUAUU	CUCUGCUC
	7630	AGAGCAGA	CUGAUGA	X	GAA	AAUAUAUA	UAUAUAUUC	UCUGCUCU
	7632	AAAGAGCA	CUGAUGA	X	GAA	AGAAUAUA	UAUAUUCUC	UGCUCUUU
	7637	AAUACAAA	CUGAUGA	X	GAA	AGCAGAGA	UCUCUGCUC	UUUGUAUU
25	7639	AGAAUACA	CUGAUGA	X	GAA	AGAGCAGA	UCUGCUCUU	UGUAUUCU
	7640	GAGAAUAC	CUGAUGA	X	GAA	AAGAGCAG	CUGCUCUUU	GUAUUCUC
	7643	AAGGAGAA	CUGAUGA	X	GAA	ACAAAGAG	CUCUUUGUA	UUCUCCUU
	7645	CAAAGGAG	CUGAUGA	X	GAA	AUACAAAG	CUUUGUAUU	CUCCUUUG
	7646	UCAAAGGA	CUGAUGA	X	GAA	AAUACAAA	UUUGUAUUC	UCCUUUGA
30	7648	GUUCAAAG	CUGAUGA	X	GAA	AGAAUACA	UGUAUUCUC	CUUUGAAC
	7651	CGGGUUCA	CUGAUGA	X	GAA	AGGAGAAU	AUUCUCCUU	UGAACCCG
	7652	ACGGGUUC	CUGAUGA	X	GAA	AAGGAGAA	UUCUCCUUU	GAACCCGU
	7661	GAUGUUUU	CUGAUGA	X	GAA	ACGGGUUC	GAACCCGUU	AAAACAUC

7662 GGAUGUUU CUGAUGA X GAA AACGGGUU AACCCGUUA AAACAUCC

7669 UGCCACAG CUGAUGA X GAA AUGUUUUA UAAAACAUC CUGUGGCA

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be ≥ 2 base-pairs.

Table III: Human *flt1* VEGF Receptor-Hairpin Ribozyme and Substrate Sequence

nt. Position	HP Ribozyme Sequence	Substrate
16	CGGGGAGG AGAA GAGAGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUCUCG GCU CCUCCCCG
39	CCGCUCCG AGAA GCCGCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCGGCG GCU CGGAGCGG
180	CCGCCAGA AGAA GUCCUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGGACG GAC UCUGGCGG
190	AACGACCC AGAA GCCAGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUGGCG GCC GGGUCGUU
278	GCGCGCAC AGAA GGACCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGGUCCU GCU GUGCGCGC
290	GACAGCUG AGAA GCGCGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCGCGCU GCU CAGCUGUC
295	AAGCAGAC AGAA GAGCAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGCUCA GCU GUCUGCUU
298	GAGAAGCA AGAA GCUGAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCAGCU GUC UGCUUCUC
302	CUGUGAGA AGAA GACAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUGUCU GCU UCUCACAG
420	CAUUUAUG AGAA GCUUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAAGCA GCC CAUAAAUG
486	CUUCCACA AGAA GAUUUA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAAAUCU GCC UGUGGAAG
537	UUUGCUUG AGAA GUGUUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAACACA GCU CAAGCAAA
565	AUAUUUGC AGAA GUAGAA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCUACA GCU GCAAAUAU
721	CGUAACCC AGAA GGGAAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUUCCCU GCC GGGUUACG
786	CGUUUUCC AGAA GGGAUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUCCCU GAU GGAAAACG
863	CUUCACAG AGAA GAAGCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCUUCU GAC CUGUGAAG

1056	UUUUUUUC AGAA GGGUAA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUACCCU GAU GAAAAAAA
1301	GCCGGUAA AGAA GCUUGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCAAGCG GUC UUACCGGC
1310	UCAUAGAG AGAA GGUAAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUACCG GCU CUCUAUGA
1389	AAAUAGCG AGAA GAUUUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAAUCU GCU CGCUAUUU
1535	UUUCGUAA AGAA GGGGUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACCCCA GAU UUACGAAA
1566	AGAGCCGG AGAA GGAAAC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUUUCCA GAC CCGGCUCU
1572	GGGUAGAG AGAA GGGUCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGACCCG GCU CUCUACCC
1604	CGGUACAA AGAA GGAUUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAUCCU GAC UUGUACCG
1824	AUUCUAGA AGAA GCCACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUGGCU GAC UCUAGAAU
1908	UUUGGCAC AGAA GUGAUA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAUCACA GAU GUGCCAAA
1949	CUCCUUCC AGAA GCAUUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAUGCC GAC GGAAGGAG
1973	CUGUGCAA AGAA GUUUCA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAAACU GUC UUGCACAG
2275	AGUGGUGG AGAA GCUGAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCAGCA GUU CCACCACU
2321	ACCAAGUG AGAA GAGGCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGCCUCA GAU CACUUGGU
2396	UUUCAAUA AGAA GCGUGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCACGCU GUU UAUUGAAA
2490	GUUCCUUG AGAA GUGAGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUCACU GUU CAAGGAAC
2525	UUAGAGUG AGAA GCUCCA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGAGCU GAU CACUCUAA
2625	GAUAGGUA AGAA GUCUUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAGACU GAC UACCUAUC
2652	GGAACUUC AGAA GGGUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGACCCA GAU GAAGUUCC

2684	CAUAAGGG AGAA GCUCAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUGAGCG GCU CCCUUAUG
2816	CAGCCACA AGAA GGCACG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGUGCCG GAC UGUGGCUG
2873	GCUCAGUC AGAA GAGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCUCU GAU GACUGAGC
2930	AGGCUCCC AGAA GGUUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUAACCU GCU GGGAGCCU
2963	CAAUCACC AGAA GAGGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCCUCU GAU GGUGAUUG
3157	UUCCUGAA AGAA GGAGCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGCUCCG GCU UUCAGGAA
3207	UAGAAACC AGAA GAAUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAUUCU GAC GGUUUCUA
3211	CUUGUAGA AGAA GUCAGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUGACG GUU UCUACAAG
3245	UGUAAGAA AGAA GAUCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGAUCU GAU UUCUUACA
3256	CACUUGAA AGAA GUAAGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUUACA GUU UUCAAGUG
3287	UUCUGGAA AGAA GGAACU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGUUCCU GUC UUCCAGAA
3402	CUCACAUA AGAA GGGUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAACCCC GAU UAUGUGAG
3580	CCUCAGGC AGAA GCAAAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUUUGCA GUC GCCUGAGG
3641	CCAGCAUG AGAA GAUAGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUAUCA GAU CAUGCUGG
3655	UCUGUGCC AGAA GUCCAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGGACU GCU GGCACAGA
3810	UCAGAGAA AGAA GGAGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACUCCU GCC UUCUCUGA
3846	AACUUCGG AGAA GAAAUA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAUUUCA GCU CCGAAGUU
3873	CUGACAUC AGAA GAGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCUCU GAU GAUGUCAG
3995	GAGAGGCC AGAA GAGUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCACUCU GUU GGCCUCUC

4100	UGACAUCA AGAA GCCCCG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGGGGCU GUC UGAUGUCA
4104	CUGCUGAC AGAA GACAGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUGUCU GAU GUCAGCAG
4120	AUGGCAGA AGAA GGGCCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGCCCA GUU UCUGCCAU
4135	GUGCCCAC AGAA GGAAUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAUUCCA GCU GUGGGCAC
4210	GGGCGGGG AGAA GCACGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCGUGCU GCU CCCCGCCC
4217	AGUCUGGG AGAA GGGAGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUCCCC GCC CCCAGACU
4224	GAGUUGUA AGAA GGGGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCCCCA GAC UACAACUC
4382	CAAAAAGC AGAA GGCUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAGCCA GCU GCUUUUUG
4385	UCACAAAA AGAA GCUGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCAGCU GCU UUUUGUGA
4537	GGGGUUGG AGAA GGGAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUCCCU GCU CCAACCCC
4573	CUCAAUCA AGAA GGUCCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGACCA GUU UGAUUGAG
4594	AUUGGGUG AGAA GUGCAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGCACU GAU CACCCAAU
4628	GGCUGCAG AGAA GGCCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGGCCA GCC CUGCAGCC
4636	GGGUUUUG AGAA GCAGGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCUGCA GCC CAAAACCC
4866	AGGGUCAG AGAA GGGAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUCCCA GCU CUGACCCU
4871	GUAGAAGG AGAA GAGCUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAGCUCU GAC CCUUCUAC
4905	CGCUGUCC AGAA GCUCCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGAGCA GAU GGACAGCG
5233	CUGUGCAA AGAA GAAUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUAUUCU GUU UUGCACAG
5281	CUCCUCAG AGAA GCAUUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAUGCA GUC CUGAGGAG

5319	UUUCCUCC AGAA GCCCUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGGGCU GAU GGAGGAAA
5358	GGUAUAGA AGAA GGGUCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGACCCC GUC UCUAUACC
5392	UGGGUCCC AGAA GUGUUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAACACA GUU GGGACCCA
5563	UGAGUCCC AGAA GGAGAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCUCCA GUU GGGACUCA
5622	AGUUUCAA AGAA GUUGAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCAACU GCU UUGAAACU
5738	UAGCAUCA AGAA GAGCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGCUCU GUU UGAUGCUA
5838	UAGCAUCA AGAA GAGCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGCUCU GUU UGAUGCUA
5933	CCCCAAGA AGAA GCAAUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUUGCU GCU UCUUGGGG
6022	CACAUAAG AGAA GAGGCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGCCUCU GUU CUUAUGUG
6120	UCCACAAA AGAA GCUGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCAGCG GCU UUUGUGGA
6163	GUGGAGAG AGAA GUCCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGGACA GUC CUCUCCAC
6270	AAAUUGCC AGAA GUCACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUGACA GCU GGCAAUUU
6412	AAGACAUG AGAA GCUAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUAGCU GUU CAUGUCUU
6511	UUUGAAGG AGAA GAGUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUACUCA GCU CCUUCAAA
6778	UCCACCCA AGAA GUUCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGAACA GUC UGGGUGGA
6826	ACUUCUUG AGAA GACAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUGUCA GUC CAAGAAGU
7245	AACAUAAA AGAA GUUGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCAACU GCU UUUAUGUU
7258	UGGAAGGA AGAA GAACAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGUUCU GUC UCCUUCCA
7433	CCCAUACA AGAA GCUAAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUUAGCU GAU UGUAUGGG

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7512	UUUUCAUG AGAA GGAAUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAUUCCU GUC CAUGAAAA
7606	GACAUUCA AGAA GAAAUG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAUUUCA GCC UGAAUGUC
7618	AAUAUAUA AGAA GACAUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAUGUCU GCC UAUAUAUU
7633	AUACAAAG AGAA GAGAAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUUCUCU GCU CUUUGUAU

Table IV: Human KDR VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Position	HH Ribozyme Sequence	Substrate
21	CACAGGGC CUGAUGA X GAA ACGGCCAG	CUGGCCGUC GCCCUGUG
33	UCCACGCA CUGAUGA X GAA AGCCACAG	CUGUGGCUC UGCGUGGA
56	AACCCACA CUGAUGA X GAA AGGCGGCC	GGCCGCCUC UGUGGGUU
64	ACUAGGCA CUGAUGA X GAA ACCCACAG	CUGUGGGUU UGCCUAGU
65	CACUAGGC CUGAUGA X GAA AACCCACA	UGUGGGUUU GCCUAGUG
70	AGAAACAC CUGAUGA X GAA AGGCAAAC	GUUUGCCUA GUGUUUCU
75	UCAAGAGA CUGAUGA X GAA ACACUAGG	CCUAGUGUU UCUCUUGA
76	AUCAAGAG CUGAUGA X GAA AACACUAG	CUAGUGUUU CUCUUGAU
77	GAUCAAGA CUGAUGA X GAA AAACACUA	UAGUGUUUC UCUUGAUC
79	CAGAUCAA CUGAUGA X GAA AGAAACAC	GUGUUUCUC UUGAUCUG
81	GGCAGAUC CUGAUGA X GAA AGAGAAAC	GUUUCUCUU GAUCUGCC
85	CCUGGGCA CUGAUGA X GAA AUCAAGAG	CUCUUGAUC UGCCCAGG
96	UGUAUGCU CUGAUGA X GAA AGCCUGGG	CCCAGGCUC AGCAUACA
102	UCUUUUUG CUGAUGA X GAA AUGCUGAG	CUCAGCAUA CAAAAAGA
114	AUUGUAAG CUGAUGA X GAA AUGUCUUU	AAAGACAUA CUUACAAU
117	UUAAUUGU CUGAUGA X GAA AGUAUGUC	GACAUACUU ACAAUUAA
118	CUUAAUUG CUGAUGA X GAA AAGUAUGU	ACAUACUUA CAAUUAAG
123	UUAGCCUU CUGAUGA X GAA AUUGUAAG	CUUACAAUU AAGGCUAA
124	AUUAGCCU CUGAUGA X GAA AAUUGUAA	UUACAAUUA AGGCUAAU
130	AGUUGUAU CUGAUGA X GAA AGCCUUAA	UUAAGGCUA AUACAACU
133	AAGAGUUG CUGAUGA X GAA AUUAGCCU	AGGCUAAUA CAACUCUU
139	AAUUUGAA CUGAUGA X GAA AGUUGUAU	AUACAACUC UUCAAAUU
141	GUAAUUUG CUGAUGA X GAA AGAGUUGU	ACAACUCUU CAAAUUAC
142	AGUAAUUU CUGAUGA X GAA AAGAGUUG	CAACUCUUC AAAUUACU
147	CUGCAAGU CUGAUGA X GAA AUUUGAAG	CUUCAAAUU ACUUGCAG
148	CCUGCAAG CUGAUGA X GAA AAUUUGAA	UUCAAAUUA CUUGCAGG
151	UCCCCUGC CUGAUGA X GAA AGUAAUUU	AAAUUACUU GCAGGGGA

	170	GCCAGUCC	CUGAUGA	X	GAA	AGUCCCUC	GAGGGACUU	GGACUGGC
	180	UUGGGCCA	CUGAUGA	X	GAA	AGCCAGUC	GACUGGCUU	UGGCCCAA
	181	AUUGGGCC	CUGAUGA	X	GAA	AAGCCAGU	ACUGGCUUU	GGCCCAAU
	190	ACUCUGAU	CUGAUGA	X	GAA	AUUGGGCC	GGCCCAAUA	AUCAGAGU
5	193	GCCACUCU	CUGAUGA	X	GAA	AUUAUUGG	CCAAUAAUC	AGAGUGGC
	243	UUACAGAA	CUGAUGA	X	GAA	AGGCCAUC	GAUGGCCUC	UUCUGUAA
	245	UCUUACAG	CUGAUGA	X	GAA	AGAGGCCA	UGGCCUCUU	CUGUAAGA
	246	GUCUUACA	CUGAUGA	X	GAA	AAGAGGCC	GGCCUCUUC	UGUAAGAC
	250	GAGUGUCU	CUGAUGA	X	GAA	ACAGAAGA	UCUUCUGUA	AGACACUC
10	258	GGAAUUGU	CUGAUGA	X	GAA	AGUGUCUU	AAGACACUC	ACAAUUCC
	264	ACUUUUGG	CUGAUGA	X	GAA	AUUGUGAG	CUCACAAUU	CCAAAAGU
	265	CACUUUUG	CUGAUGA	X	GAA	AAUUGUGA	UCACAAUUC	CAAAAGUG
	276	UCAUUUCC	CUGAUGA	X	GAA	AUCACUUU	AAAGUGAUC	GGAAAUGA
	296	AGCACUUG	CUGAUGA	X	GAA	AGGCUCCA	UGGAGCCUA	CAAGUGCU
15	305	CCCGGUAG	CUGAUGA	X	GAA	AGCACUUG	CAAGUGCUU	CUACCGGG
	306	UCCCGGUA	CUGAUGA	X	GAA	AAGCACUU	AAGUGCUUC	UACCGGGA
	308	UUUCCCGG	CUGAUGA	X	GAA	AGAAGCAC	GUGCUUCUA	CCGGGAAA
	323	CCGAGGCC	CUGAUGA	X	GAA	AGUCAGUU	AACUGACUU	GGCCUCGG
	329	AAAUGACC	CUGAUGA	X	GAA	AGGCCAAG	CUUGGCCUC	GGUCAUUU
20	333	ACAUAAAU	CUGAUGA	X	GAA	ACCGAGGC	GCCUCGGUC	AUUUAUGU
	336	UAGACAUA	CUGAUGA	X	GAA	AUGACCGA	UCGGUCAUU	UAUGUCUA
	337	AUAGACAU	CUGAUGA	X	GAA	AAUGACCG	CGGUCAUUU	AUGUCUAU
	338	CAUAGACA	CUGAUGA	X	GAA	AAAUGACC	GGUCAUUUA	UGUCUAUG
	342	UGAACAUA	CUGAUGA	X	GAA	ACAUAAAU	AUUUAUGUC	UAUGUUCA
25	344	CUUGAACA	CUGAUGA	X	GAA	AGACAUAA	UUAUGUCUA	UGUUCAAG
	348	UAAUCUUG	CUGAUGA	X	GAA	ACAUAGAC	GUCUAUGUU	CAAGAUUA
	349	GUAAUCUU	CUGAUGA	X	GAA	AACAUAGA	UCUAUGUUC	AAGAUUAC
	355	AGAUCUGU	CUGAUGA	X	GAA	AUCUUGAA	UUCAAGAUU	ACAGAUCU
	356	GAGAUCUG	CUGAUGA	X	GAA	AAUCUUGA	UCAAGAUUA	CAGAUCUC
30	362	UAAAUGGA	CUGAUGA	X	GAA	AUCUGUAA	UUACAGAUC	UCCAUUUA
	364	AAUAAAUG	CUGAUGA	X	GAA	AGAUCUGU	ACAGAUCUC	CAUUUAUU
	368	AAGCAAUA	CUGAUGA	X	GAA	AUGGAGAU	AUCUCCAUU	UAUUGCUU
	369	GAAGCAAU	CUGAUGA	X	GAA	AAUGGAGA	UCUCCAUUU	AUUGCUUC

	370	AGAAGCAA	CUGAUGA	X	GAA	AAAUGGAG	CUCCAUUUA	UUGCUUCU
	372	ACAGAAGC	CUGAUGA	X	GAA	AUAAAUGG	CCAUUUAUU	GCUUCUGU
	376	ACUAACAG	CUGAUGA	X	GAA	AGCAAUAA	UUAUUGCUU	CUGUUAGU
	377	CACUAACA	CUGAUGA	X	GAA	AAGCAAUA	UAUUGCUUC	UGUUAGUG
5	381	UGGUCACU	CUGAUGA	X	GAA	ACAGAAGC	GCUUCUGUU	AGUGACCA
	382	UUGGUCAC	CUGAUGA	X	GAA	AACAGAAG	CUUCUGUUA	GUGACCAA
	399	AUGUACAC	CUGAUGA	X	GAA	ACUCCAUG	CAUGGAGUC	GUGUACAU
	404	CAGUAAUG	CUGAUGA	X	GAA	ACACGACU	AGUCGUGUA	CAUUACUG
	408	UUCUCAGU	CUGAUGA	X	GAA	AUGUACAC	GUGUACAUU	ACUGAGAA
10	409	GUUCUCAG	CUGAUGA	X	GAA	AAUGUACA	UGUACAUUA	CUGAGAAC
	438	AGACAUGG	CUGAUGA	X	GAA	AUCACCAC	GUGGUGAUU	CCAUGUCU
	439	GAGACAUG	CUGAUGA	X	GAA	AAUCACCA	UGGUGAUUC	CAUGUCUC
	445	GGACCCGA	CUGAUGA	X	GAA	ACAUGGAA	UUCCAUGUC	UCGGGUCC
	447	AUGGACCC	CUGAUGA	X	GAA	AGACAUGG	CCAUGUCUC	GGGUCCAU
15	452	UUGAAAUG	CUGAUGA	X	GAA	ACCCGAGA	UCUCGGGUC	CAUUUCAA
	456	AGAUUUGA	CUGAUGA	X	GAA	AUGGACCC	GGGUCCAUU	UCAAAUCU
	457	GAGAUUUG	CUGAUGA	X	GAA	AAUGGACC	GGUCCAUUU	CAAAUCUC
	458	UGAGAUUU	CUGAUGA	X	GAA	AAAUGGAC	GUCCAUUUC	AAAUCUCA
	463	CACGUUGA	CUGAUGA	X	GAA	AUUUGAAA	UUUCAAAUC	UCAACGUG
20	465	GACACGUU	CUGAUGA	X	GAA	AGAUUUGA	UCAAAUCUC	AACGUGUC
	473	CACAAAGU	CUGAUGA	X	GAA	ACACGUUG	CAACGUGUC	ACUUUGUG
	477	CUUGCACA	CUGAUGA	X	GAA	AGUGACAC	GUGUCACUU	UGUGCAAG
	478	UCUUGCAC	CUGAUGA	X	GAA	AAGUGACA	UGUCACUUU	GUGCAAGA
	488	UUUCUGGG	CUGAUGA	X	GAA	AUCUUGCA	UGCAAGAUA	CCCAGAAA
25	503	CAGGAACA	CUGAUGA	X	GAA	AUCUCUUU	AAAGAGAUU	UGUUCCUG
	504	UCAGGAAC	CUGAUGA	X	GAA	AAUCUCUU	AAGAGAUUU	GUUCCUGA
	507	CCAUCAGG	CUGAUGA	X	GAA	ACAAAUCU	AGAUUUGUU	CCUGAUGG
	508	ACCAUCAG	CUGAUGA	X	GAA	AACAAAUC	GAUUUGUUC	CUGAUGGU
	517	AAUUCUGU	CUGAUGA	X	GAA	ACCAUCAG	CUGAUGGUA	ACAGAAUU
30	525	UCCCAGGA	CUGAUGA	X	GAA	AUUCUGUU	AACAGAAUU	UCCUGGGA
	526	GUCCCAGG	CUGAUGA	X	GAA	AAUUCUGU	ACAGAAUUU	CCUGGGAC
	527	UGUCCCAG	CUGAUGA	X	GAA	AAAUUCUG	CAGAAUUUC	CUGGGACA
	548	GAAUAGUA	CUGAUGA	X	GAA	AGCCCUUC	GAAGGGCUU	UACUAUUC

	549	GGAAUAGU	CUGAUGA	X	GAA	AAGCCCUU	AAGGGCUUU	ACUAUUCC
	550	GGGAAUAG	CUGAUGA	X	GAA	AAAGCCCU	AGGGCUUUA	CUAUUCCC
	553	GCUGGGAA	CUGAUGA	X	GAA	AGUAAAGC	GCUUUACUA	UUCCCAGC
	555	UAGCUGGG	CUGAUGA	X	GAA	AUAGUAAA	UUUACUAUU	CCCAGCUA
5	556	GUAGCUGG	CUGAUGA	X	GAA	AAUAGUAA	UUACUAUUC	CCAGCUAC
	563	UGAUCAUG	CUGAUGA	X	GAA	AGCUGGGA	UCCCAGCUA	CAUGAUCA
	570	GCAUAGCU	CUGAUGA	X	GAA	AUCAUGUA	UACAUGAUC	AGCUAUGC
	575	UGCCAGCA	CUGAUGA	X	GAA	AGCUGAUC	GAUCAGCUA	UGCUGGCA
	588	UCACAGAA	CUGAUGA	X	GAA	ACCAUGCC	GGCAUGGUC	UUCUGUGA
10	590	CUUCACAG	CUGAUGA	X	GAA	AGACCAUG	CAUGGUCUU	CUGUGAAG
	591	GCUUCACA	CUGAUGA	X	GAA	AAGACCAU	AUGGUCUUC	UGUGAAGC
	606	UCAUCAUU	CUGAUGA	X	GAA	AUUUUUGC	GCAAAAAUU	AAUGAUGA
	607	UUCAUCAU	CUGAUGA	X	GAA	AAUUUUUG	CAAAAAUUA	AUGAUGAA
	619	AGACUGGU	CUGAUGA	X	GAA	ACUUUCAU	AUGAAAGUU	ACCAGUCU
15	620	UAGACUGG	CUGAUGA	X	GAA	AACUUUCA	UGAAAGUUA	CCAGUCUA
	626	ACAUAAUA	CUGAUGA	X	GAA	ACUGGUAA	UUACCAGUC	UAUUAUGU
	628	GUACAUAA	CUGAUGA	X	GAA	AGACUGGU	ACCAGUCUA	UUAUGUAC
	630	AUGUACAU	CUGAUGA	X	GAA	AUAGACUG	CAGUCUAUU	AUGUACAU
	631	UAUGUACA	CUGAUGA	X	GAA	AAUAGACU	AGUCUAUUA	UGUACAUA
20	635	CAACUAUG	CUGAUGA	X	GAA	ACAUAAUA	UAUUAUGUA	CAUAGUUG
	639	ACGACAAC	CUGAUGA	X	GAA	AUGUACAU	AUGUACAUA	GUUGUCGU
	642	ACAACGAC	CUGAUGA	X	GAA	ACUAUGUA	UACAUAGUU	GUCGUUGU
	645	CCUACAAC	CUGAUGA	X	GAA	ACAACUAU	AUAGUUGUC	GUUGUAGG
	648	UACCCUAC	CUGAUGA	X	GAA	ACGACAAC	GUUGUCGUU	GUAGGGUA
25	651	CUAUACCC	CUGAUGA	X	GAA	ACAACGAC	GUCGUUGUA	GGGUAUAG
	656	AAAUCCUA	CUGAUGA	X	GAA	ACCCUACA	UGUAGGGUA	UAGGAUUU
	658	AUAAAUCC	CUGAUGA	X	GAA	AUACCCUA	UAGGGUAUA	GGAUUUAU
	663	ACAUCAUA	CUGAUGA	X	GAA	AUCCUAUA	UAUAGGAUU	UAUGAUGU
	664	CACAUCAU	CUGAUGA	X	GAA	AAUCCUAU	AUAGGAUUU	AUGAUGUG
30	665	CCACAUCA	CUGAUGA	X	GAA	AAAUCCUA	UAGGAUUUA	UGAUGUGG
	675	GGACUCAG	CUGAUGA	X	GAA	ACCACAUC	GAUGUGGUU	CUGAGUCC
	676	CGGACUCA	CUGAUGA	X	GAA	AACCACAU	AUGUGGUUC	UGAGUCCG
	682	AUGAGACG	CUGAUGA	X	GAA	ACUCAGAA	UUCUGAGUC	CGUCUCAU

	686	UUCCAUGA	CUGAUGA	X	GAA	ACGGACUC	GAGUCCGUC	UCAUGGAA
	688	AAUUCCAU	CUGAUGA	X	GAA	AGACGGAC	GUCCGUCUC	AUGGAAUU
	696	GAUAGUUC	CUGAUGA	X	GAA	AUUCCAUG	CAUGGAAUU	GAACUAUC
	702	CCAACAGA	CUGAUGA	X	GAA	AGUUCAAU	AUUGAACUA	UCUGUUGG
5	704	CUCCAACA	CUGAUGA	X	GAA	AUAGUUCA	UGAACUAUC	UGUUGGAG
	708	UUUUCUCC	CUGAUGA	X	GAA	ACAGAUAG	CUAUCUGUU	GGAGAAAA
	720	UUUAAGAC	CUGAUGA	X	GAA	AGCUUUUC	GAAAAGCUU	GUCUUAAA
	723	CAAUUUAA	CUGAUGA	X	GAA	ACAAGCUU	AAGCUUGUC	UUAAAUUG
	725	UACAAUUU	CUGAUGA	X	GAA	AGACAAGC	GCUUGUCUU	AAAUUGUA
10	726	GUACAAUU	CUGAUGA	X	GAA	AAGACAAG	CUUGUCUUA	AAUUGUAC
	730	UGCUGUAC	CUGAUGA	X	GAA	AUUUAAGA	UCUUAAAUU	GUACAGCA
	733	UCUUGCUG	CUGAUGA	X	GAA	ACAAUUUA	UAAAUUGUA	CAGCAAGA
	750	CCCACAUU	CUGAUGA	X	GAA	AGUUCAGU	ACUGAACUA	AAUGUGGG
	762	UUGAAGUC	CUGAUGA	X	GAA	AUCCCCAC	GUGGGGAUU	GACUUCAA
15	767	CCCAGUUG	CUGAUGA	X	GAA	AGUCAAUC	GAUUGACUU	CAACUGGG
	768	UCCCAGUU	CUGAUGA	X	GAA	AAGUCAAU	AUUGACUUC	AACUGGGA
	779	AAGAAGGG	CUGAUGA	X	GAA	AUUCCCAG	CUGGGAAUA	CCCUUCUU
	784	CUUCGAAG	CUGAUGA	X	GAA	AGGGUAUU	AAUACCCUU	CUUCGAAG
	785	GCUUCGAA	CUGAUGA	X	GAA	AAGGGUAU	AUACCCUUC	UUCGAAGC
20	787	AUGCUUCG	CUGAUGA	X	GAA	AGAAGGGU	ACCCUUCUU	CGAAGCAU
	788	GAUGCUUC	CUGAUGA	X	GAA	AAGAAGGG	CCCUUCUUC	GAAGCAUC
	796	CUUAUGCU	CUGAUGA	X	GAA	AUGCUUCG	CGAAGCAUC	AGCAUAAG
	802	AAGUUUCU	CUGAUGA	X	GAA	AUGCUGAU	AUCAGCAUA	AGAAACUU
	810	CGGUUUAC	CUGAUGA	X	GAA	AGUUUCUU	AAGAAACUU	GUAAACCG
25	813	UCUCGGUU	CUGAUGA	X	GAA	ACAAGUUU	AAACUUGUA	AACCGAGA
	825	UGGGUUUU	CUGAUGA	X	GAA	AGGUCUCG	CGAGACCUA	AAAACCCA
	836	CACUCCCA	CUGAUGA	X	GAA	ACUGGGUU	AACCCAGUC	UGGGAGUG
	857	UGCUCAAA	CUGAUGA	X	GAA	AUUUCUUC	GAAGAAAUU	UUUGAGCA
	858	GUGCUCAA	CUGAUGA	X	GAA	AAUUUCUU	AAGAAAUUU	UUGAGCAC
30	859	GGUGCUCA	CUGAUGA	X	GAA	AAAUUUCU	AGAAAUUUU	UGAGCACC
	860	AGGUGCUC	CUGAUGA	X	GAA	AAAAUUUC	GAAAUUUUU	GAGCACCU
	869	CUAUAGUU	CUGAUGA	X	GAA	AGGUGCUC	GAGCACCUU	AACUAUAG
	870	UCUAUAGU	CUGAUGA	X	GAA	AAGGUGCU	AGCACCUUA	ACUAUAGA

	874	ACCAUCUA	CUGAUGA	X	GAA	AGUUAAGG	CCUUAACUA	UAGAUGGU
	876	ACACCAUC	CUGAUGA	X	GAA	AUAGUUAA	UUAACUAUA	GAUGGUGU
	885	CUCCGGGU	CUGAUGA	X	GAA	ACACCAUC	GAUGGUGUA	ACCCGGAG
	905	AGGUGUAC	CUGAUGA	X	GAA	AUCCUUGG	CCAAGGAUU	GUACACCU
5	908	CACAGGUG	CUGAUGA	X	GAA	ACAAUCCU	AGGAUUGUA	CACCUGUG
	923	GCCCACUG	CUGAUGA	X	GAA	AUGCUGCA	UGCAGCAUC	CAGUGGGC
	956	CCCUGACA	CUGAUGA	X	GAA	AUGUGCUG	CAGCACAUU	UGUCAGGG
	957	ACCCUGAC	CUGAUGA	X	GAA	AAUGUGCU	AGCACAUUU	GUCAGGGU
	960	UGGACCCU	CUGAUGA	X	GAA	ACAAAUGU	ACAUUUGUC	AGGGUCCA
10	966	UUUUCAUG	CUGAUGA	X	GAA	ACCCUGAC	GUCAGGGUC	CAUGAAAA
	979	AGCAACAA	CUGAUGA	X	GAA	AGGUUUUU	AAAAACCUU	UUGUUGCU
	980	AAGCAACA	CUGAUGA	X	GAA	AAGGUUUU	AAAACCUUU	UGUUGCUU
	981	AAAGCAAC	CUGAUGA	X	GAA	AAAGGUUU	AAACCUUUU	GUUGCUUU
	984	CCAAAAGC	CUGAUGA	X	GAA	ACAAAAGG	CCUUUUGUU	GCUUUUGG
15	988	ACUUCCAA	CUGAUGA	X	GAA	AGCAACAA	UUGUUGCUU	UUGGAAGU
	989	CACUUCCA	CUGAUGA	X	GAA	AAGCAACA	UGUUGCUUU	UGGAAGUG
	990	CCACUUCC	CUGAUGA	X	GAA	AAAGCAAC	GUUGCUUUU	GGAAGUGG
	1007	CCACCAGA	CUGAUGA	X	GAA	AUUCCAUG	CAUGGAAUC	UCUGGUGG
	1009	UUCCACCA	CUGAUGA	X	GAA	AGAUUCCA	UGGAAUCUC	UGGUGGAA
20	1038	GGGAUUCU	CUGAUGA	X	GAA	ACACGCUC	GAGCGUGUC	AGAAUCCC
	1044	UUCGCAGG	CUGAUGA	X	GAA	AUUCUGAC	GUCAGAAUC	CCUGCGAA
	1055	AACCAAGG	CUGAUGA	X	GAA	ACUUCGCA	UGCGAAGUA	CCUUGGUU
	1059	GGGUAACC	CUGAUGA	X	GAA	AGGUACUU	AAGUACCUU	GGUUACCC
	1063	GGGUGGGU	CUGAUGA	X	GAA	ACCAAGGU	ACCUUGGUU	ACCCACCC
25	1064	GGGGUGGG	CUGAUGA	X	GAA	AACCAAGG	CCUUGGUUA	CCCACCCC
	1080	UACCAUUU	CUGAUGA	X	GAA	AUUUCUGG	CCAGAAAUA	AAAUGGUA
	1088	CAUUUUUA	CUGAUGA	X	GAA	ACCAUUUU	AAAAUGGUA	UAAAAAUG
	1090	UCCAUUUU	CUGAUGA	X	GAA	AUACCAUU	AAUGGUAUA	AAAAUGGA
	1101	UCAAGGGG	CUGAUGA	X	GAA	AUUCCAUU	AAUGGAAUA	CCCCUUGA
30	1107	UUGGACUC	CUGAUGA	X	GAA	AGGGGUAU	AUACCCCUU	GAGUCCAA
	1112	UGUGAUUG	CUGAUGA	X	GAA	ACUCAAGG	CCUUGAGUC	CAAUCACA
	1117	AAUUGUGU	CUGAUGA	X	GAA	AUUGGACU	AGUCCAAUC	ACACAAUU
	1125	CCCGCUUU	CUGAUGA	X	GAA	AUUGUGUG	CACACAAUU	AAAGCGGG

	1126	CCCCGCUU	CUGAUGA	X	GAA	AAUUGUGU	ACACAAUUA	AAGCGGGG
	1140	AUCGUCAG	CUGAUGA	X	GAA	ACAUGCCC	GGGCAUGUA	CUGACGAU
	1149	ACUUCCAU	CUGAUGA	X	GAA	AUCGUCAG	CUGACGAUU	AUGGAAGU
	1150	CACUUCCA	CUGAUGA	X	GAA	AAUCGUCA	UGACGAUUA	UGGAAGUG
5	1180	GACAGUGU	CUGAUGA	X	GAA	AUUUCCUG	CAGGAAAUU	ACACUGUC
	1181	UGACAGUG	CUGAUGA	X	GAA	AAUUUCCU	AGGAAAUUA	CACUGUCA
	1188	GUAAGGAU	CUGAUGA	X	GAA	ACAGUGUA	UACACUGUC	AUCCUUAC
	1191	UUGGUAAG	CUGAUGA	X	GAA	AUGACAGU	ACUGUCAUC	CUUACCAA
	1194	GGAUUGGU	CUGAUGA	X	GAA	AGGAUGAC	GUCAUCCUU	ACCAAUCC
10	1195	GGGAUUGG	CUGAUGA	X	GAA	AAGGAUGA	UCAUCCUUA	CCAAUCCC
	1201	UGAAAUGG	CUGAUGA	X	GAA	AUUGGUAA	UUACCAAUC	CCAUUUCA
	1206	UCCUUUGA	CUGAUGA	X	GAA	AUGGGAUU	AAUCCCAUU	UCAAAGGA
	1207	CUCCUUUG	CUGAUGA	X	GAA	AAUGGGAU	AUCCCAUUU	CAAAGGAG
	1208	UCUCCUUU	CUGAUGA	X	GAA	AAAUGGGA	UCCCAUUUC	AAAGGAGA
15	1233	ACCAGAGA	CUGAUGA	X	GAA	ACCACAUG	CAUGUGGUC	UCUCUGGU
	1235	CAACCAGA	CUGAUGA	X	GAA	AGACCACA	UGUGGUCUC	UCUGGUUG
	1237	CACAACCA	CUGAUGA	X	GAA	AGAGACCA	UGGUCUCUC	UGGUUGUG
	1242	ACAUACAC	CUGAUGA	X	GAA	ACCAGAGA	UCUCUGGUU	GUGUAUGU
	1247	GUGGGACA	CUGAUGA	X	GAA	ACACAACC	GGUUGUGUA	UGUCCCAC
20	1251	UGGGGUGG	CUGAUGA	X	GAA	ACAUACAC	GUGUAUGUC	CCACCCCA
	1263	UUCUCACC	CUGAUGA	X	GAA	AUCUGGGG	CCCCAGAUU	GGUGAGAA
	1274	AGAUUAGA	CUGAUGA	X	GAA	AUUUCUCA	UGAGAAAUC	UCUAAUCU
	1276	AGAGAUUA	CUGAUGA	X	GAA	AGAUUUCU	AGAAAUCUC	UAAUCUCU
	1278	GGAGAGAU	CUGAUGA	X	GAA	AGAGAUUU	AAAUCUCUA	AUCUCUCC
25	1281	ACAGGAGA	CUGAUGA	X	GAA	AUUAGAGA	UCUCUAAUC	UCUCCUGU
	1283	CCACAGGA	CUGAUGA	X	GAA	AGAUUAGA	UCUAAUCUC	UCCUGUGG
	1285	AUCCACAG	CUGAUGA	X	GAA	AGAGAUUA	UAAUCUCUC	CUGUGGAU
	1294	CUGGUAGG	CUGAUGA	X	GAA	AUCCACAG	CUGUGGAUU	CCUACCAG
	1295	ACUGGUAG	CUGAUGA	X	GAA	AAUCCACA	UGUGGAUUC	CUACCAGU
30	1298	CGUACUGG	CUGAUGA	X	GAA	AGGAAUCC	GGAUUCCUA	CCAGUACG
	1304	UGGUGCCG	CUGAUGA	X	GAA	ACUGGUAG	CUACCAGUA	CGGCACCA
	1315	CAGCGUUU	CUGAUGA	X	GAA	AGUGGUGC	GCACCACUC	AAACGCUG
	1330	AUAGACCG	CUGAUGA	X	GAA	ACAUGUCA	UGACAUGUA	CGGUCUAU

	1335	AUGGCAUA	CUGAUGA	X	GAA	ACCGUACA	UGUACGGUC	UAUGCCAU
	1337	GAAUGGCA	CUGAUGA	X	GAA	AGACCGUA	UACGGUCUA	UGCCAUUC
	1344	GGGGGAGG	CUGAUGA	X	GAA	AUGGCAUA	UAUGCCAUU	CCUCCCCC
	1345	CGGGGGAG	CUGAUGA	X	GAA	AAUGGCAU	AUGCCAUUC	CUCCCCCG
5	1348	AUGCGGGG	CUGAUGA	X	GAA	AGGAAUGG	CCAUUCCUC	CCCCGCAU
	1357	GUGGAUGU	CUGAUGA	X	GAA	AUGCGGGG	CCCCGCAUC	ACAUCCAC
	1362	UACCAGUG	CUGAUGA	X	GAA	AUGUGAUG	CAUCACAUC	CACUGGUA
	1370	ACUGCCAA	CUGAUGA	X	GAA	ACCAGUGG	CCACUGGUA	UUGGCAGU
	1372	CAACUGCC	CUGAUGA	X	GAA	AUACCAGU	ACUGGUAUU	GGCAGUUG
10	1379	CUUCCUCC	CUGAUGA	X	GAA	ACUGCCAA	UUGGCAGUU	GGAGGAAG
	1416	GUCACUGA	CUGAUGA	X	GAA	ACAGCUUG	CAAGCUGUC	UCAGUGAC
	1418	UUGUCACU	CUGAUGA	X	GAA	AGACAGCU	AGCUGUCUC	AGUGACAA
	1433	CACAAGGG	CUGAUGA	X	GAA	AUGGGUUU	AAACCCAUA	CCCUUGUG
	1438	UUCUUCAC	CUGAUGA	X	GAA	AGGGUAUG	CAUACCCUU	GUGAAGAA
15	1466	CUCCCUGG	CUGAUGA	X	GAA	AGUCCUCC	GGAGGACUU	CCAGGGAG
	1467	CCUCCCUG	CUGAUGA	X	GAA	AAGUCCUC	GAGGACUUC	CAGGGAGG
	1480	UUCAAUUU	CUGAUGA	X	GAA	AUUUCCUC	GAGGAAAUA	AAAUUGAA
	1485	UUAACUUC	CUGAUGA	X	GAA	AUUUUAUU	AAUAAAAUU	GAAGUUAA
	1491	UUUUUAUU	CUGAUGA	X	GAA	ACUUCAAU	AUUGAAGUU	AAUAAAAA
20	1492	AUUUUUAU	CUGAUGA	X	GAA	AACUUCAA	UUGAAGUUA	AUAAAAAU
	1495	UUGAUUUU	CUGAUGA	X	GAA	AUUAACUU	AAGUUAAUA	AAAAUCAA
	1501	AGCAAAUU	CUGAUGA	X	GAA	AUUUUUAU	AUAAAAAUC	AAUUUGCU
	1505	UUAGAGCA	CUGAUGA	X	GAA	AUUGAUUU	AAAUCAAUU	UGCUCUAA
	1506	AUUAGAGC	CUGAUGA	X	GAA	AAUUGAUU	AAUCAAUUU	GCUCUAAU
25	1510	UUCAAUUA	CUGAUGA	X	GAA	AGCAAAUU	AAUUUGCUC	UAAUUGAA
	1512	CCUUCAAU	CUGAUGA	X	GAA	AGAGCAAA	UUUGCUCUA	AUUGAAGG
	1515	UUUCCUUC	CUGAUGA	X	GAA	AUUAGAGC	GCUCUAAUU	GAAGGAAA
	1536	AGGGUACU	CUGAUGA	X	GAA	ACAGUUUU	AAAACUGUA	AGUACCCU
	1540	AACAAGGG	CUGAUGA	X	GAA	ACUUACAG	CUGUAAGUA	CCCUUGUU
30	1545	UGGAUAAC	CUGAUGA	X	GAA	AGGGUACU	AGUACCCUU	GUUAUCCA
	1548	GCUUGGAU	CUGAUGA	X	GAA	ACAAGGGU	ACCCUUGUU	AUCCAAGC
	1549	CGCUUGGA	CUGAUGA	X	GAA	AACAAGGG	CCCUUGUUA	UCCAAGCG
	1551	GCCGCUUG	CUGAUGA	X	GAA	AUAACAAG	CUUGUUAUC	CAAGCGGC

	1568	A	C	A	A	A	G	C	U	C	U	G	A	U	G
	1573	U	U	U	G	U	A	C	A	C	U	G	A	U	G
	1574	A	U	U	U	G	U	A	C	C	U	G	A	U	G
	1577	C	A	C	A	U	U	U	G	C	U	G	A	U	G
5	1593	A	C	U	U	U	G	U	U	C	U	G	A	U	G
	1602	C	C	U	C	U	C	C	C	C	U	G	A	U	G
	1623	U	G	G	A	A	G	G	A	C	U	G	A	U	G
	1625	C	G	U	G	G	A	A	G	C	U	G	A	U	G
	1628	U	C	A	C	G	U	G	G	C	U	G	A	U	G
10	1629	G	U	C	A	C	G	U	G	C	U	G	A	U	G
	1645	A	A	U	U	U	C	A	G	C	U	G	A	U	G
	1653	U	G	C	A	A	A	G	U	C	U	G	A	U	G
	1654	U	U	G	C	A	A	A	G	C	U	G	A	U	G
	1657	A	G	G	U	U	G	C	A	C	U	G	A	U	G
15	1658	C	A	G	G	U	U	G	C	C	U	G	A	U	G
	1697	A	C	C	A	C	A	A	A	C	U	G	A	U	G
	1699	G	C	A	C	C	A	C	A	C	U	G	A	U	G
	1700	U	G	C	A	C	C	A	C	C	U	G	A	U	G
	1721	C	A	A	A	C	G	U	A	C	U	G	A	U	G
20	1723	C	U	C	A	A	A	C	G	C	U	G	A	U	G
	1727	G	G	U	U	C	U	C	A	C	U	G	A	U	G
	1728	A	G	G	U	U	C	U	C	C	U	G	A	U	G
	1737	U	A	C	C	A	U	G	U	C	U	G	A	U	G
	1745	C	A	A	G	C	U	U	G	C	U	G	A	U	G
25	1752	U	G	U	G	G	G	C	C	C	U	G	A	U	G
	1765	G	A	U	U	G	G	C	A	C	U	G	A	U	G
	1773	C	C	C	A	C	A	U	G	C	U	G	A	U	G
	1787	G	U	G	U	G	G	G	C	C	U	G	A	U	G
	1800	U	U	C	U	U	G	C	A	C	U	G	A	U	G
30	1801	G	U	U	C	U	U	G	C	C	U	G	A	U	G
	1811	G	A	G	U	A	U	C	C	C	U	G	A	U	G
	1816	C	C	A	A	A	G	A	G	C	U	G	A	U	G
	1819	U	U	U	C	C	A	A	A	C	U	G	A	U	G

	1568	A	A	A	U	G	U	G	U	C	A	G	C	U	U
	1573	U	G	U	C	A	G	C	U	U	U	G	U	A	C
	1574	G	U	C	A	G	C	U	U	U	G	U	A	C	A
	1577	A	G	C	U	U	U	G	U	A	C	A	A	A	U
5	1593	G	A	A	G	C	G	G	U	C	A	A	C	A	A
	1602	A	A	C	A	A	A	G	U	C	G	G	G	A	G
	1623	U	G	A	U	C	C	U	C	C	U	U	C	C	A
	1625	G	G	U	G	A	U	C	U	C	C	U	U	C	C
	1628	G	A	U	C	U	C	C	U	U	C	C	A	C	G
10	1629	A	U	C	U	C	C	U	U	C	C	A	C	G	U
	1645	C	C	A	G	G	G	G	U	C	U	G	A	A	A
	1653	C	C	U	G	A	A	A	U	U	A	C	U	U	U
	1654	C	U	G	A	A	A	U	U	A	C	U	U	U	G
	1657	A	A	A	U	U	A	C	U	U	U	G	C	A	A
15	1658	A	A	U	U	A	C	U	U	U	G	C	A	A	C
	1697	G	A	G	C	G	U	G	U	C	U	U	U	G	G
	1699	U	G	U	C	U	U	U	G	U	G	G	U	G	C
	1700	C	G	U	C	U	U	U	G	U	G	G	U	G	C
	1721	G	A	C	A	G	A	U	C	U	A	C	G	U	U
20	1723	A	C	A	G	A	U	C	U	A	C	G	U	U	U
	1727	A	U	C	U	A	C	G	U	U	U	G	A	G	A
	1728	U	C	U	A	C	G	U	U	U	G	A	G	A	A
	1737	G	A	A	C	C	U	C	A	C	A	U	G	G	U
	1745	C	A	C	A	U	G	G	U	A	C	A	A	G	C
25	1752	U	A	C	A	A	G	C	U	U	G	G	C	C	C
	1765	C	A	C	A	G	C	C	U	C	U	G	C	C	A
	1773	C	U	G	C	C	A	A	U	C	A	U	G	U	G
	1787	G	G	G	A	G	A	G	U	U	G	C	C	C	A
	1800	A	C	A	C	C	U	G	U	U	U	G	C	A	A
30	1801	C	A	C	C	U	G	U	U	U	G	C	A	A	G
	1811	C	A	A	G	A	A	C	U	U	G	G	A	U	A
	1816	A	C	U	U	G	G	A	U	A	C	U	C	U	U
	1819	U	G	G	A	U	A	C	U	C	U	U	U	G	G

	1821	AAUUUCCA	CUGAUGA	X	GAA	AGAGUAUC	GAUACUCUU	UGGAAAUU
	1822	CAAUUUCC	CUGAUGA	X	GAA	AAGAGUAU	AUACUCUUU	GGAAAUUG
	1829	UGGCAUUC	CUGAUGA	X	GAA	AUUUCCAA	UUGGAAAUU	GAAUGCCA
	1844	UAUUAGAG	CUGAUGA	X	GAA	ACAUGGUG	CACCAUGUU	CUCUAAUA
5	1845	CUAUUAGA	CUGAUGA	X	GAA	AACAUGGU	ACCAUGUUC	UCUAAUAG
	1847	UGCUAUUA	CUGAUGA	X	GAA	AGAACAUG	CAUGUUCUC	UAAUAGCA
	1849	UGUGCUAU	CUGAUGA	X	GAA	AGAGAACA	UGUUCUCUA	AUAGCACA
	1852	AUUUGUGC	CUGAUGA	X	GAA	AUUAGAGA	UCUCUAAUA	GCACAAAU
	1866	AUGAUCAA	CUGAUGA	X	GAA	AUGUCAUU	AAUGACAUU	UUGAUCAU
10	1867	CAUGAUCA	CUGAUGA	X	GAA	AAUGUCAU	AUGACAUUU	UGAUCAUG
	1868	CCAUGAUC	CUGAUGA	X	GAA	AAAUGUCA	UGACAUUUU	GAUCAUGG
	1872	AGCUCCAU	CUGAUGA	X	GAA	AUCAAAAU	AUUUUGAUC	AUGGAGCU
	1881	GCAUUCUU	CUGAUGA	X	GAA	AGCUCCAU	AUGGAGCUU	AAGAAUGC
	1882	UGCAUUCU	CUGAUGA	X	GAA	AAGCUCCA	UGGAGCUUA	AGAAUGCA
15	1892	CCUGCAAG	CUGAUGA	X	GAA	AUGCAUUC	GAAUGCAUC	CUUGCAGG
	1895	GGUCCUGC	CUGAUGA	X	GAA	AGGAUGCA	UGCAUCCUU	GCAGGACC
	1913	GGCAGACA	CUGAUGA	X	GAA	AGUCUCCU	AGGAGACUA	UGUCUGCC
	1917	GCAAGGCA	CUGAUGA	X	GAA	ACAUAGUC	GACUAUGUC	UGCCUUGC
	1923	UCUUGAGC	CUGAUGA	X	GAA	AGGCAGAC	GUCUGCCUU	GCUCAAGA
20	1927	CCUGUCUU	CUGAUGA	X	GAA	AGCAAGGC	GCCUUGCUC	AAGACAGG
	1954	GACCACGC	CUGAUGA	X	GAA	AUGUCUUU	AAAGACAUU	GCGUGGUC
	1962	AGCUGCCU	CUGAUGA	X	GAA	ACCACGCA	UGCGUGGUC	AGGCAGCU
	1971	AGGACUGU	CUGAUGA	X	GAA	AGCUGCCU	AGGCAGCUC	ACAGUCCU
	1977	CGCUCUAG	CUGAUGA	X	GAA	ACUGUGAG	CUCACAGUC	CUAGAGCG
25	1980	ACACGCUC	CUGAUGA	X	GAA	AGGACUGU	ACAGUCCUA	GAGCGUGU
	2001	UUUCCUGU	CUGAUGA	X	GAA	AUCGUGGG	CCCACGAUC	ACAGGAAA
	2020	UGUCGUCU	CUGAUGA	X	GAA	AUUCUCCA	UGGAGAAUC	AGACGACA
	2032	UUCCCCAA	CUGAUGA	X	GAA	ACUUGUCG	CGACAAGUA	UUGGGGAA
	2034	CUUUCCCC	CUGAUGA	X	GAA	AUACUUGU	ACAAGUAUU	GGGGAAAG
30	2046	GAGACUUC	CUGAUGA	X	GAA	AUGCUUUC	GAAAGCAUC	GAAGUCUC
	2052	GUGCAUGA	CUGAUGA	X	GAA	ACUUCGAU	AUCGAAGUC	UCAUGCAC
	2054	CCGUGCAU	CUGAUGA	X	GAA	AGACUUCG	CGAAGUCUC	AUGCACGG
	2066	GAUUCCCA	CUGAUGA	X	GAA	AUGCCGUG	CACGGCAUC	UGGGAAUC

	2074	UGGAGGGG	CUGAUGA	X	GAA	AUUCCCAG	CUGGGAAUC	CCCCUCCA
	2080	GAUCUGUG	CUGAUGA	X	GAA	AGGGGGAU	AUCCCCCUC	CACAGAUC
	2088	AACCACAU	CUGAUGA	X	GAA	AUCUGUGG	CCACAGAUC	AUGUGGUU
	2096	UAUCUUUA	CUGAUGA	X	GAA	ACCACAUG	CAUGUGGUU	UAAAGAUA
5	2097	UUAUCUUU	CUGAUGA	X	GAA	AACCACAU	AUGUGGUUU	AAAGAUAA
	2098	AUUAUCUU	CUGAUGA	X	GAA	AAACCACA	UGUGGUUUA	AAGAUAAU
	2104	GGUCUCAU	CUGAUGA	X	GAA	AUCUUUAA	UUAAAGAUA	AUGAGACC
	2115	UCUUCUAC	CUGAUGA	X	GAA	AGGGUCUC	GAGACCCUU	GUAGAAGA
	2118	GAGUCUUC	CUGAUGA	X	GAA	ACAAGGGU	ACCCUUGUA	GAAGACUC
10	2126	CAAUGCCU	CUGAUGA	X	GAA	AGUCUUCU	AGAAGACUC	AGGCAUUG
	2133	UUCAAUAC	CUGAUGA	X	GAA	AUGCCUGA	UCAGGCAUU	GUAUUGAA
	2136	UCCUUCAA	CUGAUGA	X	GAA	ACAAUGCC	GGCAUUGUA	UUGAAGGA
	2138	CAUCCUUC	CUGAUGA	X	GAA	AUACAAUG	CAUUGUAUU	GAAGGAUG
	2160	CGGAUAGU	CUGAUGA	X	GAA	AGGUUCCG	CGGAACCUC	ACUAUCCG
15	2164	UCUGCGGA	CUGAUGA	X	GAA	AGUGAGGU	ACCUCACUA	UCCGCAGA
	2166	ACUCUGCG	CUGAUGA	X	GAA	AUAGUGAG	CUCACUAUC	CGCAGAGU
	2196	CAGGUGUA	CUGAUGA	X	GAA	AGGCCUUC	GAAGGCCUC	UACACCUG
	2198	GGCAGGUG	CUGAUGA	X	GAA	AGAGGCCU	AGGCCUCUA	CACCUGCC
	2220	CAGCCAAG	CUGAUGA	X	GAA	ACACUGCA	UGCAGUGUU	CUUGGCUG
20	2221	ACAGCCAA	CUGAUGA	X	GAA	AACACUGC	GCAGUGUUC	UUGGCUGU
	2223	GCACAGCC	CUGAUGA	X	GAA	AGAACACU	AGUGUUCUU	GGCUGUGC
	2246	UUAUGAAA	CUGAUGA	X	GAA	AUGCCUCC	GGAGGCAUU	UUUCAUAA
	2247	AUUAUGAA	CUGAUGA	X	GAA	AAUGCCUC	GAGGCAUUU	UUCAUAAU
	2248	UAUUAUGA	CUGAUGA	X	GAA	AAAUGCCU	AGGCAUUUU	UCAUAAUA
25	2249	CUAUUAUG	CUGAUGA	X	GAA	AAAAUGCC	GGCAUUUUU	CAUAAUAG
	2250	UCUAUUAU	CUGAUGA	X	GAA	AAAAAUGC	GCAUUUUUC	AUAAUAGA
	2253	CCUUCUAU	CUGAUGA	X	GAA	AUGAAAAA	UUUUUCAUA	AUAGAAGG
	2256	GCACCUUC	CUGAUGA	X	GAA	AUUAUGAA	UUCAUAAUA	GAAGGUGC
	2282	UGAUUUCC	CUGAUGA	X	GAA	AGUUCGUC	GACGAACUU	GGAAAUCA
30	2289	AGAAUAAU	CUGAUGA	X	GAA	AUUUCCAA	UUGGAAAUC	AUUAUUCU
	2292	ACUAGAAU	CUGAUGA	X	GAA	AUGAUUUC	GAAAUCAUU	AUUCUAGU
	2293	UACUAGAA	CUGAUGA	X	GAA	AAUGAUUU	AAAUCAUUA	UUCUAGUA
	2295	CCUACUAG	CUGAUGA	X	GAA	AUAAUGAU	AUCAUUAUU	CUAGUAGG

2296	GCCUACUA CUGAUGA X GAA	AAUAAUGA	UCAUUAUUC UAGUAGGC
2298	GUGCCUAC CUGAUGA X GAA	AGAAUAAU	AUUAUUCUA GUAGGCAC
2301	GUCGUGCC CUGAUGA X GAA	ACUAGAAU	AUUCUAGUA GGCACGAC
2316	AACAUGGC CUGAUGA X GAA	AUCACCGU	ACGGUGAUU GCCAUGUU
2324	GCCAGAAG CUGAUGA X GAA	ACAUGGCA	UGCCAUGUU CUUCUGGC
2325	AGCCAGAA CUGAUGA X GAA	AACAUGGC	GCCAUGUUC UUCUGGCU
2327	GUAGCCAG CUGAUGA X GAA	AGAACAUG	CAUGUUCUU CUGGCUAC
2328	AGUAGCCA CUGAUGA X GAA	AAGAACAU	AUGUUCUUC UGGCUACU
2334	ACAAGAAG CUGAUGA X GAA	AGCCAGAA	UUCUGGCUA CUUCUUGU
2337	AUGACAAG CUGAUGA X GAA	AGUAGCCA	UGGCUACUU CUUGUCAU
2338	GAUGACAA CUGAUGA X GAA	AAGUAGCC	GGCUACUUC UUGUCAUC
2340	AUGAUGAC CUGAUGA X GAA	AGAAGUAG	CUACUUCUU GUCAUCAU
2343	AGGAUGAU CUGAUGA X GAA	ACAAGAAG	CUUCUUGUC AUCAUCCU
2346	CCUAGGAU CUGAUGA X GAA	AUGACAAG	CUUGUCAUC AUCCUAGG
2349	GUCCCUAG CUGAUGA X GAA	AUGAUGAC	GUCAUCAUC CUAGGGAC
2352	ACGGUCCC CUGAUGA X GAA	AGGAUGAU	AUCAUCCUA GGGACCGU
2361	GCCCGCUU CUGAUGA X GAA	ACGGUCCC	GGGACCGUU AAGCGGGC
2362	GGCCCGCU CUGAUGA X GAA	AACGGUCC	GGACCGUUA AGCGGGCC
2396	UGGACAAG CUGAUGA X GAA	AGCCUGUC	GACAGGCUA CUUGUCCA
2399	CGAUGGAC CUGAUGA X GAA	AGUAGCCU	AGGCUACUU GUCCAUCG
2402	UGACGAUG CUGAUGA X GAA	ACAAGUAG	CUACUUGUC CAUCGUCA
2406	UCCAUGAC CUGAUGA X GAA	AUGGACAA	UUGUCCAUC GUCAUGGA
2409	GGAUCCAU CUGAUGA X GAA	ACGAUGGA	UCCAUCGUC AUGGAUCC
2416	UUCAUCUG CUGAUGA X GAA	AUCCAUGA	UCAUGGAUC CAGAUGAA
2427	UCCAAUGG CUGAUGA X GAA	AGUUCAUC	GAUGAACUC CCAUUGGA
2432	GUUCAUCC CUGAUGA X GAA	AUGGGAGU	ACUCCCAUU GGAUGAAC
2443	UCGUUCAC CUGAUGA X GAA	AUGUUCAU	AUGAACAUU GUGAACGA
2458	GGCAUCAU CUGAUGA X GAA	AGGCAGUC	GACUGCCUU AUGAUGCC
2459	UGGCAUCA CUGAUGA X GAA	AAGGCAGU	ACUGCCUUA UGAUGCCA
2480	CUCUGGGG CUGAUGA X GAA	AUUCCCAU	AUGGGAAUU CCCCAGAG
2481	UCUCUGGG CUGAUGA X GAA	AAUUCCCA	UGGGAAUUC CCCAGAGA
2502	GGCUUACC CUGAUGA X GAA	AGGUUCAG	CUGAACCUA GGUAAGCC
2506	AAGAGGCU CUGAUGA X GAA	ACCUAGGU	ACCUAGGUA AGCCUCUU

	2512	ACGGCCAA	CUGAUGA	X	GAA	AGGCUUAC	GUAAGCCUC	UUGGCCGU
	2514	CCACGGCC	CUGAUGA	X	GAA	AGAGGCUU	AAGCCUCUU	GGCCGUGG
	2528	CUUGGCCA	CUGAUGA	X	GAA	AGGCACCA	UGGUGCCUU	UGGCCAAG
	2529	UCUUGGCC	CUGAUGA	X	GAA	AAGGCACC	GGUGCCUUU	GGCCAAGA
5	2541	UCUGCUUC	CUGAUGA	X	GAA	AUCUCUUG	CAAGAGAUU	GAAGCAGA
	2555	CAAUUCCA	CUGAUGA	X	GAA	AGGCAUCU	AGAUGCCUU	UGGAAUUG
	2556	UCAAUUCC	CUGAUGA	X	GAA	AAGGCAUC	GAUGCCUUU	GGAAUUGA
	2562	GUCUUGUC	CUGAUGA	X	GAA	AUUCCAAA	UUUGGAAUU	GACAAGAC
	2578	UGUCCUGC	CUGAUGA	X	GAA	AGUUGCUG	CAGCAACUU	GCAGGACA
10	2589	UUGACUGC	CUGAUGA	X	GAA	ACUGUCCU	AGGACAGUA	GCAGUCAA
	2595	AACAUUUU	CUGAUGA	X	GAA	ACUGCUAC	GUAGCAGUC	AAAAUGUU
	2603	CUUCUUUC	CUGAUGA	X	GAA	ACAUUUUG	CAAAAUGUU	GAAAGAAG
	2632	GAGAGCUC	CUGAUGA	X	GAA	AUGCUCAC	GUGAGCAUC	GAGCUCUC
	2638	AGACAUGA	CUGAUGA	X	GAA	AGCUCGAU	AUCGAGCUC	UCAUGUCU
15	2640	UCAGACAU	CUGAUGA	X	GAA	AGAGCUCG	CGAGCUCUC	AUGUCUGA
	2645	UGAGUUCA	CUGAUGA	X	GAA	ACAUGAGA	UCUCAUGUC	UGAACUCA
	2652	AGGAUCUU	CUGAUGA	X	GAA	AGUUCAGA	UCUGAACUC	AAGAUCCU
	2658	UGAAUGAG	CUGAUGA	X	GAA	AUCUUGAG	CUCAAGAUC	CUCAUUCA
	2661	AUAUGAAU	CUGAUGA	X	GAA	AGGAUCUU	AAGAUCCUC	AUUCAUAU
20	2664	CCAAUAUG	CUGAUGA	X	GAA	AUGAGGAU	AUCCUCAUU	CAUAUUGG
	2665	ACCAAUAU	CUGAUGA	X	GAA	AAUGAGGA	UCCUCAUUC	AUAUUGGU
	2668	GUGACCAA	CUGAUGA	X	GAA	AUGAAUGA	UCAUUCAUA	UUGGUCAC
	2670	UGGUGACC	CUGAUGA	X	GAA	AUAUGAAU	AUUCAUAUU	GGUCACCA
	2674	GAGAUGGU	CUGAUGA	X	GAA	ACCAAUAU	AUAUUGGUC	ACCAUCUC
25	2680	CACAUUGA	CUGAUGA	X	GAA	AUGGUGAC	GUCACCAUC	UCAAUGUG
	2682	ACCACAUU	CUGAUGA	X	GAA	AGAUGGUG	CACCAUCUC	AAUGUGGU
	2691	AGAAGGUU	CUGAUGA	X	GAA	ACCACAUU	AAUGUGGUC	AACCUUCU
	2697	GCACCUAG	CUGAUGA	X	GAA	AGGUUGAC	GUCAACCUU	CUAGGUGC
	2698	GGCACCUA	CUGAUGA	X	GAA	AAGGUUGA	UCAACCUUC	UAGGUGCC
30	2700	CAGGCACC	CUGAUGA	X	GAA	AGAAGGUU	AACCUUCUA	GGUGCCUG
	2710	UGGCUUGG	CUGAUGA	X	GAA	ACAGGCAC	GUGCCUGUA	CCAAGCCA
	2730	AUCACCAU	CUGAUGA	X	GAA	AGUGGCCC	GGGCCACUC	AUGGUGAU
	2739	AAUUCCAC	CUGAUGA	X	GAA	AUCACCAU	AUGGUGAUU	GUGGAAUU

	2747	AUUUGCAG	CUGAUGA	X	GAA	AUUCCACA	UGUGGAAUU	CUGCAAAU
	2748	AAUUUGCA	CUGAUGA	X	GAA	AAUUCCAC	GUGGAAUUC	UGCAAAUU
	2756	GGUUUCCA	CUGAUGA	X	GAA	AUUUGCAG	CUGCAAAUU	UGGAAACC
	2757	AGGUUUCC	CUGAUGA	X	GAA	AAUUUGCA	UGCAAAUUU	GGAAACCU
5	2768	GGUAAGUG	CUGAUGA	X	GAA	ACAGGUUU	AAACCUGUC	CACUUACC
	2773	CCUCAGGU	CUGAUGA	X	GAA	AGUGGACA	UGUCCACUU	ACCUGAGG
	2774	UCCUCAGG	CUGAUGA	X	GAA	AAGUGGAC	GUCCACUUA	CCUGAGGA
	2798	AGGGGACA	CUGAUGA	X	GAA	AUUCAUUU	AAAUGAAUU	UGUCCCCU
	2799	UAGGGGAC	CUGAUGA	X	GAA	AAUUCAUU	AAUGAAUUU	GUCCCCUA
10	2802	UUGUAGGG	CUGAUGA	X	GAA	ACAAAUUC	GAAUUUGUC	CCCUACAA
	2807	UGGUCUUG	CUGAUGA	X	GAA	AGGGGACA	UGUCCCCUA	CAAGACCA
	2828	CUUGACGG	CUGAUGA	X	GAA	AUCGUGCC	GGCACGAUU	CCGUCAAG
	2829	CCUUGACG	CUGAUGA	X	GAA	AAUCGUGC	GCACGAUUC	CGUCAAGG
	2833	UUUCCCUU	CUGAUGA	X	GAA	ACGGAAUC	GAUUCCGUC	AAGGGAAA
15	2846	CUCCAACG	CUGAUGA	X	GAA	AGUCUUUC	GAAAGACUA	CGUUGGAG
	2850	AUUGCUCC	CUGAUGA	X	GAA	ACGUAGUC	GACUACGUU	GGAGCAAU
	2859	UCCACAGG	CUGAUGA	X	GAA	AUUGCUCC	GGAGCAAUC	CCUGUGGA
	2869	CCGUUUCA	CUGAUGA	X	GAA	AUCCACAG	CUGUGGAUC	UGAAACGG
	2882	UGCUGUCC	CUGAUGA	X	GAA	AGCGCCGU	ACGGCGCUU	GGACAGCA
20	2892	CUACUGGU	CUGAUGA	X	GAA	AUGCUGUC	GACAGCAUC	ACCAGUAG
	2899	GCUCUGGC	CUGAUGA	X	GAA	ACUGGUGA	UCACCAGUA	GCCAGAGC
	2909	AGCUGGCU	CUGAUGA	X	GAA	AGCUCUGG	CCAGAGCUC	AGCCAGCU
	2918	CAAAUCCA	CUGAUGA	X	GAA	AGCUGGCU	AGCCAGCUC	UGGAUUUG
	2924	CCUCCACA	CUGAUGA	X	GAA	AUCCAGAG	CUCUGGAUU	UGUGGAGG
25	2925	UCCUCCAC	CUGAUGA	X	GAA	AAUCCAGA	UCUGGAUUU	GUGGAGGA
	2939	CACUGAGG	CUGAUGA	X	GAA	ACUUCUCC	GGAGAAGUC	CCUCAGUG
	2943	ACAUCACU	CUGAUGA	X	GAA	AGGGACUU	AAGUCCCUC	AGUGAUGU
	2952	UCUUCUUC	CUGAUGA	X	GAA	ACAUCACU	AGUGAUGUA	GAAGAAGA
	2968	AUCUUCAG	CUGAUGA	X	GAA	AGCUUCCU	AGGAAGCUC	CUGAAGAU
30	2977	CUUAUACA	CUGAUGA	X	GAA	AUCUUCAG	CUGAAGAUC	UGUAUAAG
	2981	AGUCCUUA	CUGAUGA	X	GAA	ACAGAUCU	AGAUCUGUA	UAAGGACU
	2983	GAAGUCCU	CUGAUGA	X	GAA	AUACAGAU	AUCUGUAUA	AGGACUUC
	2990	AGGUCAGG	CUGAUGA	X	GAA	AGUCCUUA	UAAGGACUU	CCUGACCU

	2991	AAGGUCAG	CUGAUGA	X	GAA	AAGUCCUU	AAGGACUUC	CUGACCUU
	2999	GAUGCUCC	CUGAUGA	X	GAA	AGGUCAGG	CCUGACCUU	GGAGCAUC
	3007	ACAGAUGA	CUGAUGA	X	GAA	AUGCUCCA	UGGAGCAUC	UCAUCUGU
	3009	UAACAGAU	CUGAUGA	X	GAA	AGAUGCUC	GAGCAUCUC	AUCUGUUA
5	3012	CUGUAACA	CUGAUGA	X	GAA	AUGAGAUG	CAUCUCAUC	UGUUACAG
	3016	GAAGCUGU	CUGAUGA	X	GAA	ACAGAUGA	UCAUCUGUU	ACAGCUUC
	3017	GGAAGCUG	CUGAUGA	X	GAA	AACAGAUG	CAUCUGUUA	CAGCUUCC
	3023	CCACUUGG	CUGAUGA	X	GAA	AGCUGUAA	UUACAGCUU	CCAAGUGG
	3024	GCCACUUG	CUGAUGA	X	GAA	AAGCUGUA	UACAGCUUC	CAAGUGGC
10	3034	CAUGCCCU	CUGAUGA	X	GAA	AGCCACUU	AAGUGGCUA	AGGGCAUG
	3047	AUGCCAAG	CUGAUGA	X	GAA	ACUCCAUG	CAUGGAGUU	CUUGGCAU
	3048	GAUGCCAA	CUGAUGA	X	GAA	AACUCCAU	AUGGAGUUC	UUGGCAUC
	3050	GCGAUGCC	CUGAUGA	X	GAA	AGAACUCC	GGAGUUCUU	GGCAUCGC
	3056	ACUUUCGC	CUGAUGA	X	GAA	AUGCCAAG	CUUGGCAUC	GCGAAAGU
15	3067	CCUGUGGA	CUGAUGA	X	GAA	ACACUUUC	GAAAGUGUA	UCCACAGG
	3069	UCCCUGUG	CUGAUGA	X	GAA	AUACACUU	AAGUGUAUC	CACAGGGA
	3094	UAAGAGGA	CUGAUGA	X	GAA	AUUUCGUG	CACGAAAUA	UCCUCUUA
	3096	GAUAAGAG	CUGAUGA	X	GAA	AUAUUUCG	CGAAAUAUC	CUCUUAUC
	3099	UCCGAUAA	CUGAUGA	X	GAA	AGGAUAUU	AAUAUCCUC	UUAUCGGA
20	3101	UCUCCGAU	CUGAUGA	X	GAA	AGAGGAUA	UAUCCUCUU	AUCGGAGA
	3102	UUCUCCGA	CUGAUGA	X	GAA	AAGAGGAU	AUCCUCUUA	UCGGAGAA
	3104	UCUUCUCC	CUGAUGA	X	GAA	AUAAGAGG	CCUCUUAUC	GGAGAAGA
	3120	CAGAUUUU	CUGAUGA	X	GAA	ACCACGUU	AACGUGGUU	AAAAUCUG
	3121	ACAGAUUU	CUGAUGA	X	GAA	AACCACGU	ACGUGGUUA	AAAUCUGU
25	3126	AAGUCACA	CUGAUGA	X	GAA	AUUUUAAC	GUUAAAAUC	UGUGACUU
	3134	CCAAGCCA	CUGAUGA	X	GAA	AGUCACAG	CUGUGACUU	UGGCUUGG
	3135	GCCAAGCC	CUGAUGA	X	GAA	AAGUCACA	UGUGACUUU	GGCUUGGC
	3140	CCCGGGCC	CUGAUGA	X	GAA	AGCCAAAG	CUUUGGCUU	GGCCCGGG
	3151	UUUAUAAA	CUGAUGA	X	GAA	AUCCCGGG	CCCGGGAUA	UUUAUAAA
30	3153	UCUUUAUA	CUGAUGA	X	GAA	AUAUCCCG	CGGGAUAUU	UAUAAAGA
	3154	AUCUUUAU	CUGAUGA	X	GAA	AAUAUCCC	GGGAUAUUU	AUAAAGAU
	3155	GAUCUUUA	CUGAUGA	X	GAA	AAAUAUCC	GGAUAUUUA	UAAAGAUC
	3157	UGGAUCUU	CUGAUGA	X	GAA	AUAAAUAU	AUAUUUAUA	AAGAUCCA

	3163	AUAAUCUG	CUGAUGA	X	GAA	AUCUUUAU	AUAAAGAUC	CAGAUUAU
	3169	UCUGACAU	CUGAUGA	X	GAA	AUCUGGAU	AUCCAGAUU	AUGUCAGA
	3170	UUCUGACA	CUGAUGA	X	GAA	AAUCUGGA	UCCAGAUUA	UGUCAGAA
	3174	CCUUUUCU	CUGAUGA	X	GAA	ACAUAAUC	GAUUAUGUC	AGAAAAGG
5	3190	AGGGAGGC	CUGAUGA	X	GAA	AGCAUCUC	GAGAUGCUC	GCCUCCCU
	3195	UUCAAAGG	CUGAUGA	X	GAA	AGGCGAGC	GCUCGCCUC	CCUUUGAA
	3199	CCAUUUCA	CUGAUGA	X	GAA	AGGGAGGC	GCCUCCCUU	UGAAAUGG
	3200	UCCAUUUC	CUGAUGA	X	GAA	AAGGGAGG	CCUCCCUUU	GAAAUGGA
	3225	CUGUCAAA	CUGAUGA	X	GAA	AUUGUUUC	GAAACAAUU	UUUGACAG
10	3226	UCUGUCAA	CUGAUGA	X	GAA	AAUUGUUU	AAACAAUUU	UUGACAGA
	3227	CUCUGUCA	CUGAUGA	X	GAA	AAAUUGUU	AACAAUUUU	UGACAGAG
	3228	ACUCUGUC	CUGAUGA	X	GAA	AAAAUUGU	ACAAUUUUU	GACAGAGU
	3239	GGAUUGUG	CUGAUGA	X	GAA	ACACUCUG	CAGAGUGUA	CACAAUCC
	3246	UCACUCUG	CUGAUGA	X	GAA	AUUGUGUA	UACACAAUC	CAGAGUGA
15	3258	AAAGACCA	CUGAUGA	X	GAA	ACGUCACU	AGUGACGUC	UGGUCUUU
	3263	CACCAAAA	CUGAUGA	X	GAA	ACCAGACG	CGUCUGGUC	UUUUGGUG
	3265	AACACCAA	CUGAUGA	X	GAA	AGACCAGA	UCUGGUCUU	UUGGUGUU
	3266	AAACACCA	CUGAUGA	X	GAA	AAGACCAG	CUGGUCUUU	UGGUGUUU
	3267	AAAACACC	CUGAUGA	X	GAA	AAAGACCA	UGGUCUUUU	GGUGUUUU
20	3273	CACAGCAA	CUGAUGA	X	GAA	ACACCAAA	UUUGGUGUU	UUGCUGUG
	3274	CCACAGCA	CUGAUGA	X	GAA	AACACCAA	UUGGUGUUU	UGCUGUGG
	3275	CCCACAGC	CUGAUGA	X	GAA	AAACACCA	UGGUGUUUU	GCUGUGGG
	3288	AAGGAAAA	CUGAUGA	X	GAA	AUUUCCCA	UGGGAAAUA	UUUUCCUU
	3290	CUAAGGAA	CUGAUGA	X	GAA	AUAUUUCC	GGAAAUAUU	UUCCUUAG
25	3291	CCUAAGGA	CUGAUGA	X	GAA	AAUAUUUC	GAAAUAUUU	UCCUUAGG
	3292	ACCUAAGG	CUGAUGA	X	GAA	AAAUAUUU	AAAUAUUUU	CCUUAGGU
	3293	CACCUAAG	CUGAUGA	X	GAA	AAAAUAUU	AAUAUUUUC	CUUAGGUG
	3296	AAGCACCU	CUGAUGA	X	GAA	AGGAAAAU	AUUUUCCUU	AGGUGCUU
	3297	GAAGCACC	CUGAUGA	X	GAA	AAGGAAAA	UUUUCCUUA	GGUGCUUC
30	3304	AUAUGGAG	CUGAUGA	X	GAA	AGCACCUA	UAGGUGCUU	CUCCAUAU
	3305	GAUAUGGA	CUGAUGA	X	GAA	AAGCACCU	AGGUGCUUC	UCCAUAUC
	3307	AGGAUAUG	CUGAUGA	X	GAA	AGAAGCAC	GUGCUUCUC	CAUAUCCU
	3311	CCCCAGGA	CUGAUGA	X	GAA	AUGGAGAA	UUCUCCAUA	UCCUGGGG

	3313	UACCCCAG	CUGAUGA	X	GAA	AUAUGGAG	CUCCAUAUC	CUGGGGUA
	3321	UCAAUCUU	CUGAUGA	X	GAA	ACCCCAGG	CCUGGGGUA	AAGAUUGA
	3327	UCUUCAUC	CUGAUGA	X	GAA	AUCUUUAC	GUAAAGAUU	GAUGAAGA
	3338	GCCUACAA	CUGAUGA	X	GAA	AUUCUUCA	UGAAGAAUU	UUGUAGGC
5	3339	CGCCUACA	CUGAUGA	X	GAA	AAUUCUUC	GAAGAAUUU	UGUAGGCG
	3340	UCGCCUAC	CUGAUGA	X	GAA	AAAUUCUU	AAGAAUUUU	GUAGGCGA
	3343	CAAUCGCC	CUGAUGA	X	GAA	ACAAAAUU	AAUUUUGUA	GGCGAUUG
	3350	CUUCUUUC	CUGAUGA	X	GAA	AUCGCCUA	UAGGCGAUU	GAAAGAAG
	3364	CCUCAUUC	CUGAUGA	X	GAA	AGUUCCUU	AAGGAACUA	GAAUGAGG
10	3382	UGUAGUAU	CUGAUGA	X	GAA	AUCAGGGG	CCCCUGAUU	AUACUACA
	3383	GUGUAGUA	CUGAUGA	X	GAA	AAUCAGGG	CCCUGAUUA	UACUACAC
	3385	UGGUGUAG	CUGAUGA	X	GAA	AUAAUCAG	CUGAUUAUA	CUACACCA
	3388	UUCUGGUG	CUGAUGA	X	GAA	AGUAUAAU	AUUAUACUA	CACCAGAA
	3401	UGGUCUGG	CUGAUGA	X	GAA	ACAUUUCU	AGAAAUGUA	CCAGACCA
15	3439	GGGUCUCU	CUGAUGA	X	GAA	ACUGGGCU	AGCCCAGUC	AGAGACCC
	3452	ACUCUGAA	CUGAUGA	X	GAA	ACGUGGGU	ACCCACGUU	UUCAGAGU
	3453	AACUCUGA	CUGAUGA	X	GAA	AACGUGGG	CCCACGUUU	UCAGAGUU
	3454	CAACUCUG	CUGAUGA	X	GAA	AAACGUGG	CCACGUUUU	CAGAGUUG
	3455	CCAACUCU	CUGAUGA	X	GAA	AAAACGUG	CACGUUUUC	AGAGUUGG
20	3461	GUUCCACC	CUGAUGA	X	GAA	ACUCUGAA	UUCAGAGUU	GGUGGAAC
	3472	AUUUCCCA	CUGAUGA	X	GAA	AUGUUCCA	UGGAACAUU	UGGGAAAU
	3473	GAUUUCCC	CUGAUGA	X	GAA	AAUGUUCC	GGAACAUUU	GGGAAAUC
	3481	UUGCAAGA	CUGAUGA	X	GAA	AUUUCCCA	UGGGAAAUC	UCUUGCAA
	3483	GCUUGCAA	CUGAUGA	X	GAA	AGAUUUCC	GGAAAUCUC	UUGCAAGC
25	3485	UAGCUUGC	CUGAUGA	X	GAA	AGAGAUUU	AAAUCUCUU	GCAAGCUA
	3493	CUGAGCAU	CUGAUGA	X	GAA	AGCUUGCA	UGCAAGCUA	AUGCUCAG
	3499	AUCCUGCU	CUGAUGA	X	GAA	AGCAUUAG	CUAAUGCUC	AGCAGGAU
	3518	GAACAAUG	CUGAUGA	X	GAA	AGUCUUUG	CAAAGACUA	CAUUGUUC
	3522	GGAAGAAC	CUGAUGA	X	GAA	AUGUAGUC	GACUACAUU	GUUCUUCC
30	3525	AUCGGAAG	CUGAUGA	X	GAA	ACAAUGUA	UACAUUGUU	CUUCCGAU
	3526	UAUCGGAA	CUGAUGA	X	GAA	AACAAUGU	ACAUUGUUC	UUCCGAUA
	3528	GAUAUCGG	CUGAUGA	X	GAA	AGAACAAU	AUUGUUCUU	CCGAUAUC
	3529	UGAUAUCG	CUGAUGA	X	GAA	AAGAACAA	UUGUUCUUC	CGAUAUCA

	3534	GUCUCUGA	CUGAUGA	X	GAA	AUCGGAAG	CUUCCGAUA	UCAGAGAC
	3536	AAGUCUCU	CUGAUGA	X	GAA	AUAUCGGA	UCCGAUAUC	AGAGACUU
	3544	CAUGCUCA	CUGAUGA	X	GAA	AGUCUCUG	CAGAGACUU	UGAGCAUG
	3545	CCAUGCUC	CUGAUGA	X	GAA	AAGUCUCU	AGAGACUUU	GAGCAUGG
5	3562	GAGUCCAG	CUGAUGA	X	GAA	AUCCUCUU	AAGAGGAUU	CUGGACUC
	3563	AGAGUCCA	CUGAUGA	X	GAA	AAUCCUCU	AGAGGAUUC	UGGACUCU
	3570	GGCAGAGA	CUGAUGA	X	GAA	AGUCCAGA	UCUGGACUC	UCUCUGCC
	3572	UAGGCAGA	CUGAUGA	X	GAA	AGAGUCCA	UGGACUCUC	UCUGCCUA
	3574	GGUAGGCA	CUGAUGA	X	GAA	AGAGAGUC	GACUCUCUC	UGCCUACC
10	3580	AGGUGAGG	CUGAUGA	X	GAA	AGGCAGAG	CUCUGCCUA	CCUCACCU
	3584	AAACAGGU	CUGAUGA	X	GAA	AGGUAGGC	GCCUACCUC	ACCUGUUU
	3591	AUACAGGA	CUGAUGA	X	GAA	ACAGGUGA	UCACCUGUU	UCCUGUAU
	3592	CAUACAGG	CUGAUGA	X	GAA	AACAGGUG	CACCUGUUU	CCUGUAUG
	3593	CCAUACAG	CUGAUGA	X	GAA	AAACAGGU	ACCUGUUUC	CUGUAUGG
15	3598	CUCCUCCA	CUGAUGA	X	GAA	ACAGGAAA	UUUCCUGUA	UGGAGGAG
	3615	GGGUCACA	CUGAUGA	X	GAA	ACUUCCUC	GAGGAAGUA	UGUGACCC
	3629	CAUAAUGG	CUGAUGA	X	GAA	AUUUGGGG	CCCCAAAUU	CCAUUAUG
	3630	UCAUAAUG	CUGAUGA	X	GAA	AAUUUGGG	CCCAAAUUC	CAUUAUGA
	3634	GUUGUCAU	CUGAUGA	X	GAA	AUGGAAUU	AAUUCCAUU	AUGACAAC
20	3635	UGUUGUCA	CUGAUGA	X	GAA	AAUGGAAU	AUUCCAUUA	UGACAACA
	3654	UACUGACU	CUGAUGA	X	GAA	AUUCCUGC	GCAGGAAUC	AGUCAGUA
	3658	CAGAUACU	CUGAUGA	X	GAA	ACUGAUUC	GAAUCAGUC	AGUAUCUG
	3662	UCUGCAGA	CUGAUGA	X	GAA	ACUGACUG	CAGUCAGUA	UCUGCAGA
	3664	GUUCUGCA	CUGAUGA	X	GAA	AUACUGAC	GUCAGUAUC	UGCAGAAC
25	3676	CUUUCGCU	CUGAUGA	X	GAA	ACUGUUCU	AGAACAGUA	AGCGAAAG
	3702	AAUGUUUU	CUGAUGA	X	GAA	ACACUCAC	GUGAGUGUA	AAAACAUU
	3710	UAUCUUCA	CUGAUGA	X	GAA	AUGUUUUU	AAAAACAUU	UGAAGAUA
	3711	AUAUCUUC	CUGAUGA	X	GAA	AAUGUUUU	AAAACAUUU	GAAGAUAU
	3718	UAACGGGA	CUGAUGA	X	GAA	AUCUUCAA	UUGAAGAUA	UCCCGUUA
30	3720	UCUAACGG	CUGAUGA	X	GAA	AUAUCUUC	GAAGAUAUC	CCGUUAGA
	3725	GUUCUUCU	CUGAUGA	X	GAA	ACGGGAUA	UAUCCCGUU	AGAAGAAC
	3726	GGUUCUUC	CUGAUGA	X	GAA	AACGGGAU	AUCCCGUUA	GAAGAACC
	3741	AUUACUUU	CUGAUGA	X	GAA	ACUUCUGG	CCAGAAGUA	AAAGUAAU

	3747	UCUGGGAU	CUGAUGA	X	GAA	ACUUUUAC	GUAAAAGUA	AUCCCAGA
	3750	UCAUCUGG	CUGAUGA	X	GAA	AUUACUUU	AAAGUAAUC	CCAGAUGA
	3778	AAGAACCA	CUGAUGA	X	GAA	ACCACUGU	ACAGUGGUA	UGGUUCUU
	3783	GAGGCAAG	CUGAUGA	X	GAA	ACCAUACC	GGUAUGGUU	CUUGCCUC
5	3784	UGAGGCAA	CUGAUGA	X	GAA	AACCAUAC	GUAUGGUUC	UUGCCUCA
	3786	UCUGAGGC	CUGAUGA	X	GAA	AGAACCAU	AUGGUUCUU	GCCUCAGA
	3791	GCUCUUCU	CUGAUGA	X	GAA	AGGCAAGA	UCUUGCCUC	AGAAGAGC
	3808	GUCUUCCA	CUGAUGA	X	GAA	AGUUUUCA	UGAAAACUU	UGGAAGAC
	3809	UGUCUUCC	CUGAUGA	X	GAA	AAGUUUUC	GAAAACUUU	GGAAGACA
10	3827	AUGGAGAU	CUGAUGA	X	GAA	AUUUGGUU	AACCAAAUU	AUCUCCAU
	3828	GAUGGAGA	CUGAUGA	X	GAA	AAUUUGGU	ACCAAAUUA	UCUCCAUC
	3830	AAGAUGGA	CUGAUGA	X	GAA	AUAAUUUG	CAAAUUAUC	UCCAUCUU
	3832	AAAAGAUG	CUGAUGA	X	GAA	AGAUAAUU	AAUUAUCUC	CAUCUUUU
	3836	CACCAAAA	CUGAUGA	X	GAA	AUGGAGAU	AUCUCCAUC	UUUUGGUG
15	3838	UCCACCAA	CUGAUGA	X	GAA	AGAUGGAG	CUCCAUCUU	UUGGUGGA
	3839	UUCCACCA	CUGAUGA	X	GAA	AAGAUGGA	UCCAUCUUU	UGGUGGAA
	3840	AUUCCACC	CUGAUGA	X	GAA	AAAGAUGG	CCAUCUUUU	GGUGGAAU
	3872	AUGCCACA	CUGAUGA	X	GAA	ACUCCCUG	CAGGGAGUC	UGUGGCAU
	3881	AGCCUUCA	CUGAUGA	X	GAA	AUGCCACA	UGUGGCAUC	UGAAGGCU
20	3890	UCUGGUUU	CUGAUGA	X	GAA	AGCCUUCA	UGAAGGCUC	AAACCAGA
	3908	CGGACUGG	CUGAUGA	X	GAA	AGCCGCUU	AAGCGGCUA	CCAGUCCG
	3914	GAUAUCCG	CUGAUGA	X	GAA	ACUGGUAG	CUACCAGUC	CGGAUAUC
	3920	CGGAGUGA	CUGAUGA	X	GAA	AUCCGGAC	GUCCGGAUA	UCACUCCG
	3922	AUCGGAGU	CUGAUGA	X	GAA	AUAUCCGG	CCGGAUAUC	ACUCCGAU
25	3926	UGUCAUCG	CUGAUGA	X	GAA	AGUGAUAU	AUAUCACUC	CGAUGACA
	3950	CACUGGAG	CUGAUGA	X	GAA	ACACGGUG	CACCGUGUA	CUCCAGUG
	3953	CCUCACUG	CUGAUGA	X	GAA	AGUACACG	CGUGUACUC	CAGUGAGG
	3972	AGCUUUAA	CUGAUGA	X	GAA	AGUUCUGC	GCAGAACUU	UUAAAGCU
	3973	CAGCUUUA	CUGAUGA	X	GAA	AAGUUCUG	CAGAACUUU	UAAAGCUG
30	3974	UCAGCUUU	CUGAUGA	X	GAA	AAAGUUCU	AGAACUUUU	AAAGCUGA
	3975	AUCAGCUU	CUGAUGA	X	GAA	AAAAGUUC	GAACUUUUA	AAGCUGAU
	3984	CCAAUCUC	CUGAUGA	X	GAA	AUCAGCUU	AAGCUGAUA	GAGAUUGG
	3990	UGCACUCC	CUGAUGA	X	GAA	AUCUCUAU	AUAGAGAUU	GGAGUGCA

	4006	GGCUGUGC	CUGAUGA	X	GAA	ACCGGUUU	AAACCGGUA	GCACAGCC
	4020	GGCUGGAG	CUGAUGA	X	GAA	AUCUGGGC	GCCCAGAUU	CUCCAGCC
	4021	AGGCUGGA	CUGAUGA	X	GAA	AAUCUGGG	CCCAGAUUC	UCCAGCCU
	4023	UCAGGCUG	CUGAUGA	X	GAA	AGAAUCUG	CAGAUUCUC	CAGCCUGA
5	4052	CAGGAGGA	CUGAUGA	X	GAA	AGCUCAGU	ACUGAGCUC	UCCUCCUG
	4054	AACAGGAG	CUGAUGA	X	GAA	AGAGCUCA	UGAGCUCUC	CUCCUGUU
	4057	UUAAACAG	CUGAUGA	X	GAA	AGGAGAGC	GCUCUCCUC	CUGUUUAA
	4062	UCCUUUUA	CUGAUGA	X	GAA	ACAGGAGG	CCUCCUGUU	UAAAAGGA
	4063	UUCCUUUU	CUGAUGA	X	GAA	AACAGGAG	CUCCUGUUU	AAAAGGAA
10	4064	CUUCCUUU	CUGAUGA	X	GAA	AAACAGGA	UCCUGUUUA	AAAGGAAG
	4076	GGGGUGUG	CUGAUGA	X	GAA	AUGCUUCC	GGAAGCAUC	CACACCCC
	4089	AUGUCCGG	CUGAUGA	X	GAA	AGUUGGGG	CCCCAACUC	CCGGACAU
	4098	UCUCAUGU	CUGAUGA	X	GAA	AUGUCCGG	CCGGACAUC	ACAUGAGA
	4110	UCUGAGCA	CUGAUGA	X	GAA	ACCUCUCA	UGAGAGGUC	UGCUCAGA
15	4115	CAAAAUCU	CUGAUGA	X	GAA	AGCAGACC	GGUCUGCUC	AGAUUUUG
	4120	CACUUCAA	CUGAUGA	X	GAA	AUCUGAGC	GCUCAGAUU	UUGAAGUG
	4121	ACACUUCA	CUGAUGA	X	GAA	AAUCUGAG	CUCAGAUUU	UGAAGUGU
	4122	AACACUUC	CUGAUGA	X	GAA	AAAUCUGA	UCAGAUUUU	GAAGUGUU
	4130	GAAAGAAC	CUGAUGA	X	GAA	ACACUUCA	UGAAGUGUU	GUUCUUUC
20	4133	GUGGAAAG	CUGAUGA	X	GAA	ACAACACU	AGUGUUGUU	CUUUCCAC
	4134	GGUGGAAA	CUGAUGA	X	GAA	AACAACAC	GUGUUGUUC	UUUCCACC
	4136	CUGGUGGA	CUGAUGA	X	GAA	AGAACAAC	GUUGUUCUU	UCCACCAG
	4137	GCUGGUGG	CUGAUGA	X	GAA	AAGAACAA	UUGUUCUUU	CCACCAGC
	4138	UGCUGGUG	CUGAUGA	X	GAA	AAAGAACA	UGUUCUUUC	CACCAGCA
25	4153	AAUGCGGC	CUGAUGA	X	GAA	ACUUCCUG	CAGGAAGUA	GCCGCAUU
	4161	GAAAAUCA	CUGAUGA	X	GAA	AUGCGGCU	AGCCGCAUU	UGAUUUUC
	4162	UGAAAAUC	CUGAUGA	X	GAA	AAUGCGGC	GCCGCAUUU	GAUUUUCA
	4166	GAAAUGAA	CUGAUGA	X	GAA	AUCAAAUG	CAUUUGAUU	UUCAUUUC
	4167	CGAAAUGA	CUGAUGA	X	GAA	AAUCAAAU	AUUUGAUUU	UCAUUUCG
30	4168	UCGAAAUG	CUGAUGA	X	GAA	AAAUCAAA	UUUGAUUUU	CAUUUCGA
	4169	GUCGAAAU	CUGAUGA	X	GAA	AAAAUCAA	UUGAUUUUC	AUUUCGAC
	4172	GUUGUCGA	CUGAUGA	X	GAA	AUGAAAAU	AUUUUCAUU	UCGACAAC
	4173	UGUUGUCG	CUGAUGA	X	GAA	AAUGAAAA	UUUUCAUUU	CGACAACA

4174	CUGUUGUC CUGAUGA X GAA	AAAUGAAA	UUUCAUUUC GACAACAG
4194	UGCAGUCC CUGAUGA X GAA	AGGUCCUU	AAGGACCUC GGACUGCA
4214	GCCUAGAA CUGAUGA X GAA	AGCUGGCU	AGCCAGCUC UUCUAGGC
4216	AAGCCUAG CUGAUGA X GAA	AGAGCUGG	CCAGCUCUU CUAGGCUU
4217	CAAGCCUA CUGAUGA X GAA	AAGAGCUG	CAGCUCUUC UAGGCUUG
4219	CACAAGCC CUGAUGA X GAA	AGAAGAGC	GCUCUUCUA GGCUUGUG

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be ≥ 2 base-pairs.

Table V: Human KDR VEGF Receptor-Hairpin Ribozyme and Substrate Sequences

nt. Position	Hairpin Ribozyme Sequence	Substrate
11	CGACGGCC AGAA GCACCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGUGCU GCU GGCCGUCG
18	CACAGGGC AGAA GCCAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUGGCC GUC GCCCUGUG
51	CCCACAGA AGAA GCCCGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCGGGCC GCC UCUGUGGG
86	UGAGCCUG AGAA GAUCAA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUGAUCU GCC CAGGCUCA
318	GAGGCCAA AGAA GUUUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAAACU GAC UUGGCCUC
358	AAAUGGAG AGAA GUAAUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUUACA GAU CUCCAUUU
510	CUGUUACC AGAA GGAACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUUCCU GAU GGUAACAG
623	ACAUAAUA AGAA GGUAAC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUUACCA GUC UAUUAUGU
683	UUCCAUGA AGAA GACUCA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAGUCC GUC UCAUGGAA
705	UUUUCUCC AGAA GAUAGU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUAUCU GUU GGAGAAAA
833	CACUCCCA AGAA GGGUUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAACCCA GUC UGGGAGUG
932	UCUUGGUC AGAA GCCCAC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUGGGCU GAU GACCAAGA
1142	CCAUAAUC AGAA GUACAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGUACU GAC GAUUAUGG
1259	UCUCACCA AGAA GGGGUG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACCCCA GAU UGGUGAGA
1332	AUGGCAUA AGAA GUACAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGUACG GUC UAUGCCAU

1376	CUUCCUCC	AGAA	GCCAAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUUGGCA	GUU	GGAGGAAG
1413	GUCACUGA	AGAA	GCUUGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCAAGCU	GUC	UCAGUGAC
1569	UUGUACAA	AGAA	GACACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUGUCA	GCU	UUGUACAA
1673	GCUCAGUG	AGAA	GCAUGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACAUGCA	GCC	CACUGAGC
1717	AAACGUAG	AGAA	GUCUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCAGACA	GAU	CUACGUUU
1760	UUGGCAGA	AGAA	GUGGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCCACA	GCC	UCUGCCAA
1797	UUCUUGCA	AGAA	GGUGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACACCU	GUU	UGCAAGAA
1918	UUGAGCAA	AGAA	GACAUA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAUGUCU	GCC	UUGCUCAA
1967	GGACUGUG	AGAA	GCCUGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCAGGCA	GCU	CACAGUCC
1974	CGCUCUAG	AGAA	GUGAGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUCACA	GUC	CUAGAGCG
2021	UACUUGUC	AGAA	GAUUCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGAAUCA	GAC	GACAAGUA
2084	ACCACAUG	AGAA	GUGGAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCCACA	GAU	CAUGUGGU
2418	GGGAGUUC	AGAA	GGAUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAUCCA	GAU	GAACUCCC
2453	CAUCAUAA	AGAA	GUCGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACGACU	GCC	UUAUGAUG
2492	CUAGGUUC	AGAA	GGUCUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGACCG	GCU	GAACCUAG
2547	CCAAAGGC	AGAA	GCUUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAAGCA	GAU	GCCUUUGG
2765	GGUAAGUG	AGAA	GGUUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAACCU	GUC	CACUUACC
2914	AAAUCCAG	AGAA	GGCUGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCAGCCA	GCU	CUGGAUUU
2993	GCUCCAAG	AGAA	GGAAGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUUCCU	GAC	CUUGGAGC

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3019	CACUUGGA AGAA GUAACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUUACA GCU UCCAAGUG
3165	CUGACAUA AGAA GGAUCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGAUCCA GAU UAUGUCAG
3378	GUAGUAUA AGAA GGGGCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCCCCU GAU UAUACUAC
3404	CCAGCAUG AGAA GGUACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUACCA GAC CAUGCUGG
3418	CCCGUGCC AGAA GUCCAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGGACU GCU GGCACGGG
3575	GUGAGGUA AGAA GAGAGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUCUCU GCC UACCUCAC
3588	AUACAGGA AGAA GGUGAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCACCU GUU UCCUGUAU
3689	CACUCACA AGAA GGCUCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGAGCCG GCC UGUGAGUG
3753	UGGUUGUC AGAA GGGAUU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAUCCCA GAU GACAACCA
3764	CACUGUCC AGAA GGUUGU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACAACCA GAC GGACAGUG
3911	GAUAUCCG AGAA GGUAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUACCA GUC CGGAUAUC
3927	UCUGUGUC AGAA GAGUGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCACUCC GAU GACACAGA
4011	AGAAUCUG AGAA GUGCUA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAGCACA GCC CAGAUUCU
4016	GCUGGAGA AGAA GGGCUG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAGCCCA GAU UCUCCAGC
4025	CCGUGUCA AGAA GGAGAA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCUCCA GCC UGACACGG
4059	UCCUUUUA AGAA GGAGGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCUCCU GUU UAAAAGGA
4111	AAAAUCUG AGAA GACCUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGGUCU GCU CAGAUUUU
4116	ACUUCAAA AGAA GAGCAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGCUCA GAU UUUGAAGU
4195	UCCCUGCA AGAA GAGGUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GACCUCG GAC UGCAGGGA

4210 CCUAGAAG AGAA GGCUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA GGAGCCA GCU CUUCUAGG

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Table VI: Mouse *flk*-1 VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Position	HH Ribozyme Sequence	Substrate
13	CCGUACCC CUGAUGA X GAA AUUCGCCC	GGGCGAAUU GGGUACGG
18	GGGUCCCG CUGAUGA X GAA ACCCAAUU	AAUUGGGUA CGGGACCC
31	UCGACCUC CUGAUGA X GAA AGGGGGGU	ACCCCCCUC GAGGUCGA
37	AUACCGUC CUGAUGA X GAA ACCUCGAG	CUCGAGGUC GACGGUAU
44	CUUAUCGA CUGAUGA X GAA ACCGUCGA	UCGACGGUA UCGAUAAG
46	AGCUUAUC CUGAUGA X GAA AUACCGUC	GACGGUAUC GAUAAGCU
50	AUCAAGCU CUGAUGA X GAA AUCGAUAC	GUAUCGAUA AGCUUGAU
55	UCGAUAUC CUGAUGA X GAA AGCUUAUC	GAUAAGCUU GAUAUCGA
59	GAAUUCGA CUGAUGA X GAA AUCAAGCU	AGCUUGAUA UCGAAUUC
61	CCGAAUUC CUGAUGA X GAA AUAUCAAG	CUUGAUAUC GAAUUCGG
66	UGGGCCCG CUGAUGA X GAA AUUCGAUA	UAUCGAAUU CGGGCCCA
67	CUGGGCCC CUGAUGA X GAA AAUUCGAU	AUCGAAUUC GGGCCCAG
83	GGCUGCGG CUGAUGA X GAA ACACAGUC	GACUGUGUC CCGCAGCC
97	AGCCAGGU CUGAUGA X GAA AUCCCGGC	GCCGGGAUA ACCUGGCU
114	GUCCGCGG CUGAUGA X GAA AUCGGGUC	GACCCGAUU CCGCGGAC
115	UGUCCGCG CUGAUGA X GAA AAUCGGGU	ACCCGAUUC CGCGGACA
169	ACCGGGGA CUGAUGA X GAA AGCGCGGG	CCCGCGCUC UCCCCGGU
171	AGACCGGG CUGAUGA X GAA AGAGCGCG	CGCGCUCUC CCCGGUCU
178	CAGCGCAA CUGAUGA X GAA ACCGGGGA	UCCCCGGUC UUGCGCUG
180	CGCAGCGC CUGAUGA X GAA AGACCGGG	CCCGGUCUU GCGCUGCG
197	AGAGGCGG CUGAUGA X GAA AUGGCCCC	GGGGCCAUA CCGCCUCU
204	AAGUCACA CUGAUGA X GAA AGGCGGUA	UACCGCCUC UGUGACUU
212	CCGCAAAG CUGAUGA X GAA AGUCACAG	CUGUGACUU CUUUGCGG
213	CCCGCAAA CUGAUGA X GAA AAGUCACA	UGUGACUUC UUUGCGGG
215	GGCCCGCA CUGAUGA X GAA AGAAGUCA	UGACUUCUU UGCGGGCC

	216	UGGCCCGC	CUGAUGA	X	GAA	AAGAAGUC	GACUUCUUU	GCGGGCCA
	241	CAGGCACA	CUGAUGA	X	GAA	ACUCCUUC	GAAGGAGUC	UGUGCCUG
	262	UGGGCACA	CUGAUGA	X	GAA	AGCCCAGU	ACUGGGCUC	UGUGCCCA
	306	GCGACAGC	CUGAUGA	X	GAA	AGCAGCGC	GCGCUGCUA	GCUGUCGC
5	312	CACAGAGC	CUGAUGA	X	GAA	ACAGCUAG	CUAGCUGUC	GCUCUGUG
	316	GAACCACA	CUGAUGA	X	GAA	AGCGACAG	CUGUCGCUC	UGUGGUUC
	323	CCACGCAG	CUGAUGA	X	GAA	ACCACAGA	UCUGUGGUU	CUGCGUGG
	324	UCCACGCA	CUGAUGA	X	GAA	AACCACAG	CUGUGGUUC	UGCGUGGA
	347	AACCCACA	CUGAUGA	X	GAA	AGGCGGCU	AGCCGCCUC	UGUGGGUU
10	355	GCCAGUCA	CUGAUGA	X	GAA	ACCCACAG	CUGUGGGUU	UGACUGGC
	356	CGCCAGUC	CUGAUGA	X	GAA	AACCCACA	UGUGGGUUU	GACUGGCG
	367	AUGGAGAA	CUGAUGA	X	GAA	AUCGCCAG	CUGGCGAUU	UUCUCCAU
	368	GAUGGAGA	CUGAUGA	X	GAA	AAUCGCCA	UGGCGAUUU	UCUCCAUC
	369	GGAUGGAG	CUGAUGA	X	GAA	AAAUCGCC	GGCGAUUUU	CUCCAUCC
15	370	GGGAUGGA	CUGAUGA	X	GAA	AAAAUCGC	GCGAUUUUC	UCCAUCCC
	372	GGGGGAUG	CUGAUGA	X	GAA	AGAAAAUC	GAUUUUCUC	CAUCCCCC
	376	CUUGGGGG	CUGAUGA	X	GAA	AUGGAGAA	UUCUCCAUC	CCCCCAAG
	387	UGUGUGCU	CUGAUGA	X	GAA	AGCUUGGG	CCCAAGCUC	AGCACACA
	405	AUUGUCAG	CUGAUGA	X	GAA	AUGUCUUU	AAAGACAUA	CUGACAAU
20	414	UUUGCCAA	CUGAUGA	X	GAA	AUUGUCAG	CUGACAAUU	UUGGCAAA
	415	AUUUGCCA	CUGAUGA	X	GAA	AAUUGUCA	UGACAAUUU	UGGCAAAU
	416	UAUUUGCC	CUGAUGA	X	GAA	AAAUUGUC	GACAAUUUU	GGCAAAUA
	424	AAGGGUUG	CUGAUGA	X	GAA	AUUUGCCA	UGGCAAAUA	CAACCCUU
	432	GUAAUCUG	CUGAUGA	X	GAA	AGGGUUGU	ACAACCCUU	CAGAUUAC
25	433	AGUAAUCU	CUGAUGA	X	GAA	AAGGGUUG	CAACCCUUC	AGAUUACU
	438	CUGCAAGU	CUGAUGA	X	GAA	AUCUGAAG	CUUCAGAUU	ACUUGCAG
	439	CCUGCAAG	CUGAUGA	X	GAA	AAUCUGAA	UUCAGAUUA	CUUGCAGG
	442	UCCCCUGC	CUGAUGA	X	GAA	AGUAAUCU	AGAUUACUU	GCAGGGGA
	471	UUGGGCCA	CUGAUGA	X	GAA	AGCCAGUC	GACUGGCUU	UGGCCCAA
30	472	AUUGGGCC	CUGAUGA	X	GAA	AAGCCAGU	ACUGGCUUU	GGCCCAAU

	484	AUCACGCU	CUGAUGA	X	GAA	AGCAUUGG	CCAAUGCUC	AGCGUGAU
	493	UUCCUCAG	CUGAUGA	X	GAA	AUCACGCU	AGCGUGAUU	CUGAGGAA
	494	UUUCCUCA	CUGAUGA	X	GAA	AAUCACGC	GCGUGAUUC	UGAGGAAA
	507	GUCACCAA	CUGAUGA	X	GAA	ACCCUUUC	GAAAGGGUA	UUGGUGAC
5	509	CAGUCACC	CUGAUGA	X	GAA	AUACCCUU	AAGGGUAUU	GGUGACUG
	538	GCAGAAGA	CUGAUGA	X	GAA	ACUGUCAC	GUGACAGUA	UCUUCUGC
	540	UUGCAGAA	CUGAUGA	X	GAA	AUACUGUC	GACAGUAUC	UUCUGCAA
	542	UUUUGCAG	CUGAUGA	X	GAA	AGAUACUG	CAGUAUCUU	CUGCAAAA
	543	GUUUUGCA	CUGAUGA	X	GAA	AAGAUACU	AGUAUCUUC	UGCAAAAC
10	555	GGAAUGGU	CUGAUGA	X	GAA	AGUGUUUU	AAAACACUC	ACCAUUCC
	561	ACCCUGGG	CUGAUGA	X	GAA	AUGGUGAG	CUCACCAUU	CCCAGGGU
	562	CACCCUGG	CUGAUGA	X	GAA	AAUGGUGA	UCACCAUUC	CCAGGGUG
	573	UCAUUUCC	CUGAUGA	X	GAA	ACCACCCU	AGGGUGGUU	GGAAAUGA
	583	GGCUCCAG	CUGAUGA	X	GAA	AUCAUUUC	GAAAUGAUA	CUGGAGCC
15	593	AGCACUUG	CUGAUGA	X	GAA	AGGCUCCA	UGGAGCCUA	CAAGUGCU
	602	CCCGGUAC	CUGAUGA	X	GAA	AGCACUUG	CAAGUGCUC	GUACCGGG
	605	CGUCCCGG	CUGAUGA	X	GAA	ACGAGCAC	GUGCUCGUA	CCGGGACG
	615	GCUAUGUC	CUGAUGA	X	GAA	ACGUCCCG	CGGGACGUC	GACAUAGC
	621	GUGGAGGC	CUGAUGA	X	GAA	AUGUCGAC	GUCGACAUA	GCCUCCAC
20	626	AAACAGUG	CUGAUGA	X	GAA	AGGCUAUG	CAUAGCCUC	CACUGUUU
	633	UAGACAUA	CUGAUGA	X	GAA	ACAGUGGA	UCCACUGUU	UAUGUCUA
	634	AUAGACAU	CUGAUGA	X	GAA	AACAGUGG	CCACUGUUU	AUGUCUAU
	635	CAUAGACA	CUGAUGA	X	GAA	AAACAGUG	CACUGUUUA	UGUCUAUG
	639	CGAACAUA	CUGAUGA	X	GAA	ACAUAAAC	GUUUAUGUC	UAUGUUCG
25	641	CUCGAACA	CUGAUGA	X	GAA	AGACAUAA	UUAUGUCUA	UGUUCGAG
	645	UAAUCUCG	CUGAUGA	X	GAA	ACAUAGAC	GUCUAUGUU	CGAGAUUA
	646	GUAAUCUC	CUGAUGA	X	GAA	AACAUAGA	UCUAUGUUC	GAGAUUAC
	652	UGAUCUGU	CUGAUGA	X	GAA	AUCUCGAA	UUCGAGAUU	ACAGAUCA
	653	GUGAUCUG	CUGAUGA	X	GAA	AAUCUCGA	UCGAGAUUA	CAGAUCAC
30	659	UGAAUGGU	CUGAUGA	X	GAA	AUCUGUAA	UUACAGAUC	ACCAUUCA

	665	AGGCGAUG	CUGAUGA	X	GAA	AUGGUGAU	AUCACCAUU	CAUCGCCU
	666	GAGGCGAU	CUGAUGA	X	GAA	AAUGGUGA	UCACCAUUC	AUCGCCUC
	669	ACAGAGGC	CUGAUGA	X	GAA	AUGAAUGG	CCAUUCAUC	GCCUCUGU
	674	CACUGACA	CUGAUGA	X	GAA	AGGCGAUG	CAUCGCCUC	UGUCAGUG
5	678	UGGUCACU	CUGAUGA	X	GAA	ACAGAGGC	GCCUCUGUC	AGUGACCA
	696	AUGUACAC	CUGAUGA	X	GAA	AUGCCAUG	CAUGGCAUC	GUGUACAU
	701	CGGUGAUG	CUGAUGA	X	GAA	ACACGAUG	CAUCGUGUA	CAUCACCG
	705	UUCUCGGU	CUGAUGA	X	GAA	AUGUACAC	GUGUACAUC	ACCGAGAA
	735	CGGCAGGG	CUGAUGA	X	GAA	AUCACCAC	GUGGUGAUC	CCCUGCCG
10	749	UUGAAAUC	CUGAUGA	X	GAA	ACCCUCGG	CCGAGGGUC	GAUUUCAA
	753	AGGUUUGA	CUGAUGA	X	GAA	AUCGACCC	GGGUCGAUU	UCAAACCU
	754	GAGGUUUG	CUGAUGA	X	GAA	AAUCGACC	GGUCGAUUU	CAAACCUC
	755	UGAGGUUU	CUGAUGA	X	GAA	AAAUCGAC	GUCGAUUUC	AAACCUCA
	762	GACACAUU	CUGAUGA	X	GAA	AGGUUUGA	UCAAACCUC	AAUGUGUC
15	770	CGCAAAGA	CUGAUGA	X	GAA	ACACAUUG	CAAUGUGUC	UCUUUGCG
	772	AGCGCAAA	CUGAUGA	X	GAA	AGACACAU	AUGUGUCUC	UUUGCGCU
	774	CUAGCGCA	CUGAUGA	X	GAA	AGAGACAC	GUGUCUCUU	UGCGCUAG
	775	CCUAGCGC	CUGAUGA	X	GAA	AAGAGACA	UGUCUCUUU	GCGCUAGG
	781	UGGAUACC	CUGAUGA	X	GAA	AGCGCAAA	UUUGCGCUA	GGUAUCCA
20	785	UUUCUGGA	CUGAUGA	X	GAA	ACCUAGCG	CGCUAGGUA	UCCAGAAA
	787	CUUUUCUG	CUGAUGA	X	GAA	AUACCUAG	CUAGGUAUC	CAGAAAAG
	800	CCGGAACA	CUGAUGA	X	GAA	AUCUCUUU	AAAGAGAUU	UGUUCCGG
	801	UCCGGAAC	CUGAUGA	X	GAA	AAUCUCUU	AAGAGAUUU	GUUCCGGA
	804	CCAUCCGG	CUGAUGA	X	GAA	ACAAAUCU	AGAUUUGUU	CCGGAUGG
25	805	UCCAUCCG	CUGAUGA	X	GAA	AACAAAUC	GAUUUGUUC	CGGAUGGA
	822	UCCCAGGA	CUGAUGA	X	GAA	AUUCUGUU	AACAGAAUU	UCCUGGGA
	823	GUCCCAGG	CUGAUGA	X	GAA	AAUUCUGU	ACAGAAUUU	CCUGGGAC
	824	UGUCCCAG	CUGAUGA	X	GAA	AAAUUCUG	CAGAAUUUC	CUGGGACA
	840	GUAAAGCC	CUGAUGA	X	GAA	AUCUCGCU	AGCGAGAUA	GGCUUUAC
30	845	GGAGAGUA	CUGAUGA	X	GAA	AGCCUAUC	GAUAGGCUU	UACUCUCC

	846	GGGAGAGU	CUGAUGA	X	GAA	AAGCCUAU	AUAGGCUUU	ACUCUCCC
	847	GGGGAGAG	CUGAUGA	X	GAA	AAAGCCUA	UAGGCUUUA	CUCUCCCC
	850	ACUGGGGA	CUGAUGA	X	GAA	AGUAAAGC	GCUUUACUC	UCCCCAGU
	852	UAACUGGG	CUGAUGA	X	GAA	AGAGUAAA	UUUACUCUC	CCCAGUUA
5	859	GAUCAUGU	CUGAUGA	X	GAA	ACUGGGGA	UCCCCAGUU	ACAUGAUC
	860	UGAUCAUG	CUGAUGA	X	GAA	AACUGGGG	CCCCAGUUA	CAUGAUCA
	867	GCAUAGCU	CUGAUGA	X	GAA	AUCAUGUA	UACAUGAUC	AGCUAUGC
	872	UGCCGGCA	CUGAUGA	X	GAA	AGCUGAUC	GAUCAGCUA	UGCCGGCA
	885	UCACAGAA	CUGAUGA	X	GAA	ACCAUGCC	GGCAUGGUC	UUCUGUGA
10	887	CCUCACAG	CUGAUGA	X	GAA	AGACCAUG	CAUGGUCUU	CUGUGAGG
	888	GCCUCACA	CUGAUGA	X	GAA	AAGACCAU	AUGGUCUUC	UGUGAGGC
	903	UCAUCAUU	CUGAUGA	X	GAA	AUCUUUGC	GCAAAGAUC	AAUGAUGA
	917	UAGACUGA	CUGAUGA	X	GAA	AGGUUUCA	UGAAACCUA	UCAGUCUA
	919	GAUAGACU	CUGAUGA	X	GAA	AUAGGUUU	AAACCUAUC	AGUCUAUC
15	923	ACAUGAUA	CUGAUGA	X	GAA	ACUGAUAG	CUAUCAGUC	UAUCAUGU
	925	GUACAUGA	CUGAUGA	X	GAA	AGACUGAU	AUCAGUCUA	UCAUGUAC
	927	AUGUACAU	CUGAUGA	X	GAA	AUAGACUG	CAGUCUAUC	AUGUACAU
	932	CAACUAUG	CUGAUGA	X	GAA	ACAUGAUA	UAUCAUGUA	CAUAGUUG
	936	ACCACAAC	CUGAUGA	X	GAA	AUGUACAU	AUGUACAUA	GUUGUGGU
20	939	ACAACCAC	CUGAUGA	X	GAA	ACUAUGUA	UACAUAGUU	GUGGUUGU
	945	UAUCCUAC	CUGAUGA	X	GAA	ACCACAAC	GUUGUGGUU	GUAGGAUA
	948	CUAUAUCC	CUGAUGA	X	GAA	ACAACCAC	GUGGUUGUA	GGAUAUAG
	953	AAAUCCUA	CUGAUGA	X	GAA	AUCCUACA	UGUAGGAUA	UAGGAUUU
	955	AUAAAUCC	CUGAUGA	X	GAA	AUAUCCUA	UAGGAUAUA	GGAUUUAU
25	960	ACAUCAUA	CUGAUGA	X	GAA	AUCCUAUA	UAUAGGAUU	UAUGAUGU
	961	CACAUCAU	CUGAUGA	X	GAA	AAUCCUAU	AUAGGAUUU	AUGAUGUG
	962	UCACAUCA	CUGAUGA	X	GAA	AAAUCCUA	UAGGAUUUA	UGAUGUGA
	972	GGGCUCAG	CUGAUGA	X	GAA	AUCACAUC	GAUGUGAUU	CUGAGCCC
	973	GGGGCUCA	CUGAUGA	X	GAA	AAUCACAU	AUGUGAUUC	UGAGCCCC
30	993	GAUAGCUC	CUGAUGA	X	GAA	AUUUCAUG	CAUGAAAUU	GAGCUAUC

	999	CCGGCAGA	CUGAUGA	X	GAA	AGCUCAAU	AUUGAGCUA	UCUGCCGG
	1001	CUCCGGCA	CUGAUGA	X	GAA	AUAGCUCA	UGAGCUAUC	UGCCGGAG
	1017	UUUAAGAC	CUGAUGA	X	GAA	AGUUUUUC	GAAAAACUU	GUCUUAAA
	1020	CAAUUUAA	CUGAUGA	X	GAA	ACAAGUUU	AAACUUGUC	UUAAAUUG
5	1022	UACAAUUU	CUGAUGA	X	GAA	AGACAAGU	ACUUGUCUU	AAAUUGUA
	1023	GUACAAUU	CUGAUGA	X	GAA	AAGACAAG	CUUGUCUUA	AAUUGUAC
	1027	CGCUGUAC	CUGAUGA	X	GAA	AUUUAAGA	UCUUAAAUU	GUACAGCG
	1030	UCUCGCUG	CUGAUGA	X	GAA	ACAAUUUA	UAAAUUGUA	CAGCGAGA
	1047	CCCACAUU	CUGAUGA	X	GAA	AGCUCUGU	ACAGAGCUC	AAUGUGGG
10	1059	GUGAAAUC	CUGAUGA	X	GAA	AGCCCCAC	GUGGGGCUU	GAUUUCAC
	1063	CCAGGUGA	CUGAUGA	X	GAA	AUCAAGCC	GGCUUGAUU	UCACCUGG
	1064	GCCAGGUG	CUGAUGA	X	GAA	AAUCAAGC	GCUUGAUUU	CACCUGGC
	1065	UGCCAGGU	CUGAUGA	X	GAA	AAAUCAAG	CUUGAUUUC	ACCUGGCA
	1076	AAGGUGGA	CUGAUGA	X	GAA	AGUGCCAG	CUGGCACUC	UCCACCUU
15	1078	UGAAGGUG	CUGAUGA	X	GAA	AGAGUGCC	GGCACUCUC	CACCUUCA
	1084	AGACUUUG	CUGAUGA	X	GAA	AGGUGGAG	CUCCACCUU	CAAAGUCU
	1085	GAGACUUU	CUGAUGA	X	GAA	AAGGUGGA	UCCACCUUC	AAAGUCUC
	1091	UAUGAUGA	CUGAUGA	X	GAA	ACUUUGAA	UUCAAAGUC	UCAUCAUA
	1093	CUUAUGAU	CUGAUGA	X	GAA	AGACUUUG	CAAAGUCUC	AUCAUAAG
20	1096	CUUCUUAU	CUGAUGA	X	GAA	AUGAGACU	AGUCUCAUC	AUAAGAAG
	1099	AAUCUUCU	CUGAUGA	X	GAA	AUGAUGAG	CUCAUCAUA	AGAAGAUU
	1107	CGGUUUAC	CUGAUGA	X	GAA	AUCUUCUU	AAGAAGAUU	GUAAACCG
	1110	UCCCGGUU	CUGAUGA	X	GAA	ACAAUCUU	AAGAUUGUA	AACCGGGA
	1130	UCCCAGGA	CUGAUGA	X	GAA	AGGGUUUC	GAAACCCUU	UCCUGGGA
25	1131	GUCCCAGG	CUGAUGA	X	GAA	AAGGGUUU	AAACCCUUU	CCUGGGAC
	1132	AGUCCCAG	CUGAUGA	X	GAA	AAAGGGUU	AACCCUUUC	CUGGGACU
	1154	UGCUCAAA	CUGAUGA	X	GAA	ACAUCUUC	GAAGAUGUU	UUUGAGCA
	1155	GUGCUCAA	CUGAUGA	X	GAA	AACAUCUU	AAGAUGUUU	UUGAGCAC
	1156	GGUGCUCA	CUGAUGA	X	GAA	AAACAUCU	AGAUGUUUU	UGAGCACC
30	1157	AGGUGCUC	CUGAUGA	X	GAA	AAAACAUC	GAUGUUUUU	GAGCACCU

1166 CUAUUGUC CUGAUGA X GAA AGGUGCUC GAGCACCUU GACAAUAG
1173 ACACUUUC CUGAUGA X GAA AUUGUCAA UUGACAAUA GAAAGUGU
1205 CACAGGUG CUGAUGA X GAA AUUCCCCU AGGGGAAUA CACCUGUG
1215 CUGGACGC CUGAUGA X GAA ACACAGGU ACCUGUGUA GCGUCCAG
1220 GUCCACUG CUGAUGA X GAA ACGCUACA UGUAGCGUC CAGUGGAC
1236 UUUCUCUU CUGAUGA X GAA AUCAUCCG CGGAUGAUC AAGAGAAA
1246 AAAUGUUC CUGAUGA X GAA AUUUCUCU AGAGAAAUA GAACAUUU
1253 CUCGGACA CUGAUGA X GAA AUGUUCUA UAGAACAUU UGUCCGAG
1254 ACUCGGAC CUGAUGA X GAA AAUGUUCU AGAACAUUU GUCCGAGU
1257 UGAACUCG CUGAUGA X GAA ACAAAUGU ACAUUUGUC CGAGUUCA
1263 UUUGUGUG CUGAUGA X GAA ACUCGGAC GUCCGAGUU CACACAAA
1264 CUUUGUGU CUGAUGA X GAA AACUCGGA UCCGAGUUC ACACAAAG
1276 AGCAAUAA CUGAUGA X GAA AGGCUUUG CAAAGCCUU UUAUUGCU
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1279 GAAAGCAA CUGAUGA X GAA AAAAGGCU AGCCUUUUA UUGCUUUC
1281 CCGAAAGC CUGAUGA X GAA AUAAAAGG CCUUUUAUU GCUUUCGG
1285 ACUACCGA CUGAUGA X GAA AGCAAUAA UUAUUGCUU UCGGUAGU
1286 CACUACCG CUGAUGA X GAA AAGCAAUA UAUUGCUUU CGGUAGUG
1287 CCACUACC CUGAUGA X GAA AAAGCAAU AUUGCUUUC GGUAGUGG
1291 CAUCCCAC CUGAUGA X GAA ACCGAAAG CUUUCGGUA GUGGGAUG
1304 CCACCAAA CUGAUGA X GAA AUUUCAUC GAUGAAAUC UUUGGUGG
1306 UUCCACCA CUGAUGA X GAA AGAUUUCA UGAAAUCUU UGGUGGAA
1307 CUUCCACC CUGAUGA X GAA AAGAUUUC GAAAUCUUU GGUGGAAG
1330 UCGGACUU CUGAUGA X GAA ACUGCCCA UGGGCAGUC AAGUCCGA
1335 GGGAUUCG CUGAUGA X GAA ACUUGACU AGUCAAGUC CGAAUCCC
1341 UUCACAGG CUGAUGA X GAA AUUCGGAC GUCCGAAUC CCUGUGAA
1352 AACUGAGA CUGAUGA X GAA ACUUCACA UGUGAAGUA UCUCAGUU
1354 GUAACUGA CUGAUGA X GAA AUACUUCA UGAAGUAUC UCAGUUAC
1356 GGGUAACU CUGAUGA X GAA AGAUACUU AAGUAUCUC AGUUACCC

1360 AGCUGGGU CUGAUGA X GAA ACUGAGAU AUCUCAGUU ACCCAGCU
1361 GAGCUGGG CUGAUGA X GAA AACUGAGA UCUCAGUUA CCCAGCUC
1369 GAUAUCAG CUGAUGA X GAA AGCUGGGU ACCCAGCUC CUGAUAUC
1375 CCAUUUGA CUGAUGA X GAA AUCAGGAG CUCCUGAUA UCAAAUGG
1377 UACCAUUU CUGAUGA X GAA AUAUCAGG CCUGAUAUC AAAUGGUA
1385 CAUUUCUG CUGAUGA X GAA ACCAUUUG CAAAUGGUA CAGAAAUG
1404 UUGGACUC CUGAUGA X GAA AUGGGCCU AGGCCCAUU GAGUCCAA
1409 UGUAGUUG CUGAUGA X GAA ACUCAAUG CAUUGAGUC CAACUACA
1415 UCAUUGUG CUGAUGA X GAA AGUUGGAC GUCCAACUA CACAAUGA
1425 UCGCCAAC CUGAUGA X GAA AUCAUUGU ACAAUGAUU GUUGGCGA
1428 UCAUCGCC CUGAUGA X GAA ACAAUCAU AUGAUUGUU GGCGAUGA
1440 AUGAUGGU CUGAUGA X GAA AGUUCAUC GAUGAACUC ACCAUCAU
1446 ACUUCCAU CUGAUGA X GAA AUGGUGAG CUCACCAUC AUGGAAGU
1478 UGACCGUG CUGAUGA X GAA AGUUUCCU AGGAAACUA CACGGUCA
1485 GUGAGGAU CUGAUGA X GAA ACCGUGUA UACACGGUC AUCCUCAC
1488 UUGGUGAG CUGAUGA X GAA AUGACCGU ACGGUCAUC CUCACCAA
1491 GGGUUGGU CUGAUGA X GAA AGGAUGAC GUCAUCCUC ACCAACCC
1503 UCCAUUGA CUGAUGA X GAA AUGGGGUU AACCCCAUU UCAAUGGA
1504 CUCCAUUG CUGAUGA X GAA AAUGGGGU ACCCCAUUU CAAUGGAG
1505 UCUCCAUU CUGAUGA X GAA AAAUGGGG CCCCAUUUC AAUGGAGA
1530 ACCAGAGA CUGAUGA X GAA ACCAUGUG CACAUGGUC UCUCUGGU
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1539 ACAUUCAC CUGAUGA X GAA ACCAGAGA UCUCUGGUU GUGAAUGU
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1560 UUCUCACC CUGAUGA X GAA AUCUGGGG CCCCAGAUC GGUGAGAA
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1591 CUGGUAGG CUGAUGA X GAA AUCCAUAG CUAUGGAUU CCUACCAG
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1595 CAUACUGG CUGAUGA X GAA AGGAAUCC GGAUUCCUA CCAGUAUG
1601 UGGUCCCA CUGAUGA X GAA ACUGGUAG CUACCAGUA UGGGACCA
1619 UGCAUGUC CUGAUGA X GAA AUGUCUGC GCAGACAUU GACAUGCA
1632 UUGGCGUA CUGAUGA X GAA ACUGUGCA UGCACAGUC UACGCCAA
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1667 GCUGCCAG CUGAUGA X GAA ACCACUGG CCAGUGGUA CUGGCAGC
1677 GCUUCUUC CUGAUGA X GAA AGCUGCCA UGGCAGCUA GAAGAAGC
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1694 CGGGUCUG CUGAUGA X GAA AGGAGCAG CUGCUCCUA CAGACCCG
1718 UACAAGCA CUGAUGA X GAA ACGGGCUU AAGCCCGUA UGCUUGUA
1723 UUCUUUAC CUGAUGA X GAA AGCAUACG CGUAUGCUU GUAAAGAA
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1750 CCCCUGGA CUGAUGA X GAA AUCCUCCA UGGAGGAUU UCCAGGGG
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1770 GUGACUUC CUGAUGA X GAA AUCUUGUU AACAAGAUC GAAGUCAC
1776 UUUUUGGU CUGAUGA X GAA ACUUCGAU AUCGAAGUC ACCAAAAA
1790 UCAGGGCA CUGAUGA X GAA AUUGGUUU AAACCAAUA UGCCCUGA
1800 UUUCCUUC CUGAUGA X GAA AUCAGGGC GCCCUGAUU GAAGGAAA
1821 AGCGUACU CUGAUGA X GAA ACAGUUUU AAAACUGUA AGUACGCU
1825 GACCAGCG CUGAUGA X GAA ACUUACAG CUGUAAGUA CGCUGGUC
1833 GCUUGGAU CUGAUGA X GAA ACCAGCGU ACGCUGGUC AUCCAAGC
1836 GCAGCUUG CUGAUGA X GAA AUGACCAG CUGGUCAUC CAAGCUGC
1853 ACAACGCU CUGAUGA X GAA ACACGUUG CAACGUGUC AGCGUUGU
1859 AUUUGUAC CUGAUGA X GAA ACGCUGAC GUCAGCGUU GUACAAAU
1862 CACAUUUG CUGAUGA X GAA ACAACGCU AGCGUUGUA CAAAUGUG

	1878	GCUUUGUU	CUGAUGA	X	GAA	AUGGCUUC	GAAGCCAUC	AACAAAGC
	1905	AAGGAGAU	CUGAUGA	X	GAA	ACCCUCUC	GAGAGGGUC	AUCUCCUU
	1908	UGGAAGGA	CUGAUGA	X	GAA	AUGACCCU	AGGGUCAUC	UCCUUCCA
	1910	CAUGGAAG	CUGAUGA	X	GAA	AGAUGACC	GGUCAUCUC	CUUCCAUG
5	1913	UCACAUGG	CUGAUGA	X	GAA	AGGAGAUG	CAUCUCCUU	CCAUGUGA
	1914	AUCACAUG	CUGAUGA	X	GAA	AAGGAGAU	AUCUCCUUC	CAUGUGAU
	1923	GGACCCCU	CUGAUGA	X	GAA	AUCACAUG	CAUGUGAUC	AGGGGUCC
	1930	AAUUUCAG	CUGAUGA	X	GAA	ACCCCUGA	UCAGGGGUC	CUGAAAUU
	1938	UGCACAGU	CUGAUGA	X	GAA	AUUUCAGG	CCUGAAAUU	ACUGUGCA
10	1939	UUGCACAG	CUGAUGA	X	GAA	AAUUUCAG	CUGAAAUUA	CUGUGCAA
	1982	ACAACAGG	CUGAUGA	X	GAA	ACACACUC	GAGUGUGUC	CCUGUUGU
	1988	CAGUGCAC	CUGAUGA	X	GAA	ACAGGGAC	GUCCCUGUU	GUGCACUG
	2008	CUCAAACG	CUGAUGA	X	GAA	AUUUCUGU	ACAGAAAUA	CGUUUGAG
	2012	GGUUCUCA	CUGAUGA	X	GAA	ACGUAUUU	AAAUACGUU	UGAGAACC
15	2013	AGGUUCUC	CUGAUGA	X	GAA	AACGUAUU	AAUACGUUU	GAGAACCU
	2022	UACCACGU	CUGAUGA	X	GAA	AGGUUCUC	GAGAACCUC	ACGUGGUA
	2030	CAAGCUUG	CUGAUGA	X	GAA	ACCACGUG	CACGUGGUA	CAAGCUUG
	2037	UGUGAGCC	CUGAUGA	X	GAA	AGCUUGUA	UACAAGCUU	GGCUCACA
	2042	UUGCCUGU	CUGAUGA	X	GAA	AGCCAAGC	GCUUGGCUC	ACAGGCAA
20	2054	UGUGGACC	CUGAUGA	X	GAA	AUGUUGCC	GGCAACAUC	GGUCCACA
	2058	CCCAUGUG	CUGAUGA	X	GAA	ACCGAUGU	ACAUCGGUC	CACAUGGG
	2072	GUGUGAGU	CUGAUGA	X	GAA	AUUCGCCC	GGGCGAAUC	ACUCACAC
	2076	ACUGGUGU	CUGAUGA	X	GAA	AGUGAUUC	GAAUCACUC	ACACCAGU
	2085	UUCUUGCA	CUGAUGA	X	GAA	ACUGGUGU	ACACCAGUU	UGCAAGAA
25	2086	GUUCUUGC	CUGAUGA	X	GAA	AACUGGUG	CACCAGUUU	GCAAGAAC
	2096	GAGCAUCC	CUGAUGA	X	GAA	AGUUCUUG	CAAGAACUU	GGAUGCUC
	2104	UUUCCAAA	CUGAUGA	X	GAA	AGCAUCCA	UGGAUGCUC	UUUGGAAA
	2106	AGUUUCCA	CUGAUGA	X	GAA	AGAGCAUC	GAUGCUCUU	UGGAAACU
	2107	CAGUUUCC	CUGAUGA	X	GAA	AAGAGCAU	AUGCUCUUU	GGAAACUG
30	2129	UGUUAGAA	CUGAUGA	X	GAA	ACAUGGUG	CACCAUGUU	UUCUAACA

	2130	CUGUUAGA	CUGAUGA	X	GAA	AACAUGGU	ACCAUGUUU	UCUAACAG
	2131	GCUGUUAG	CUGAUGA	X	GAA	AAACAUGG	CCAUGUUUU	CUAACAGC
	2132	UGCUGUUA	CUGAUGA	X	GAA	AAAACAUG	CAUGUUUUC	UAACAGCA
	2134	UGUGCUGU	CUGAUGA	X	GAA	AGAAAACA	UGUUUUCUA	ACAGCACA
5	2151	ACAAUCAA	CUGAUGA	X	GAA	AUGUCAUU	AAUGACAUC	UUGAUUGU
	2153	CCACAAUC	CUGAUGA	X	GAA	AGAUGUCA	UGACAUCUU	GAUUGUGG
	2157	AAUGCCAC	CUGAUGA	X	GAA	AUCAAGAU	AUCUUGAUU	GUGGCAUU
	2165	CAUUCUGA	CUGAUGA	X	GAA	AUGCCACA	UGUGGCAUU	UCAGAAUG
	2166	GCAUUCUG	CUGAUGA	X	GAA	AAUGCCAC	GUGGCAUUU	CAGAAUGC
10	2167	GGCAUUCU	CUGAUGA	X	GAA	AAAUGCCA	UGGCAUUUC	AGAAUGCC
	2177	CCUGCAGA	CUGAUGA	X	GAA	AGGCAUUC	GAAUGCCUC	UCUGCAGG
	2179	GUCCUGCA	CUGAUGA	X	GAA	AGAGGCAU	AUGCCUCUC	UGCAGGAC
	2198	AGCAAACA	CUGAUGA	X	GAA	AGUCGCCU	AGGCGACUA	UGUUUGCU
	2202	GCAGAGCA	CUGAUGA	X	GAA	ACAUAGUC	GACUAUGUU	UGCUCUGC
15	2203	AGCAGAGC	CUGAUGA	X	GAA	AACAUAGU	ACUAUGUUU	GCUCUGCU
	2207	CUUGAGCA	CUGAUGA	X	GAA	AGCAAACA	UGUUUGCUC	UGCUCAAG
	2212	CUUAUCUU	CUGAUGA	X	GAA	AGCAGAGC	GCUCUGCUC	AAGAUAAG
	2218	GGUCUUCU	CUGAUGA	X	GAA	AUCUUGAG	CUCAAGAUA	AGAAGACC
	2239	GACCAGGC	CUGAUGA	X	GAA	AUGUCUUU	AAAGACAUU	GCCUGGUC
20	2247	AGCUGUUU	CUGAUGA	X	GAA	ACCAGGCA	UGCCUGGUC	AAACAGCU
	2256	AGGAUGAU	CUGAUGA	X	GAA	AGCUGUUU	AAACAGCUC	AUCAUCCU
	2259	UCUAGGAU	CUGAUGA	X	GAA	AUGAGCUG	CAGCUCAUC	AUCCUAGA
	2262	CGCUCUAG	CUGAUGA	X	GAA	AUGAUGAG	CUCAUCAUC	CUAGAGCG
	2265	AUGCGCUC	CUGAUGA	X	GAA	AGGAUGAU	AUCAUCCUA	GAGCGCAU
25	2286	UUUCCGGU	CUGAUGA	X	GAA	AUCAUGGG	CCCAUGAUC	ACCGGAAA
	2296	AUUCUCCA	CUGAUGA	X	GAA	AUUUCCGG	CCGGAAAUC	UGGAGAAU
	2305	UGUUGUCU	CUGAUGA	X	GAA	AUUCUCCA	UGGAGAAUC	AGACAACA
	2319	GUCUCGCC	CUGAUGA	X	GAA	AUGGUUGU	ACAACCAUU	GGCGAGAC
	2331	GUCACUUC	CUGAUGA	X	GAA	AUGGUCUC	GAGACCAUU	GAAGUGAC
30	2341	UGCUGGGC	CUGAUGA	X	GAA	AGUCACUU	AAGUGACUU	GCCCAGCA

	2351	GAUUUCCA	CUGAUGA	X	GAA	AUGCUGGG	CCCAGCAUC	UGGAAAUC
	2359	UGGGGUAG	CUGAUGA	X	GAA	AUUUCCAG	CUGGAAAUC	CUACCCCA
	2362	GUGUGGGG	CUGAUGA	X	GAA	AGGAUUUC	GAAAUCCUA	CCCCACAC
	2373	AACCAUGU	CUGAUGA	X	GAA	AUGUGUGG	CCACACAUU	ACAUGGUU
5	2374	GAACCAUG	CUGAUGA	X	GAA	AAUGUGUG	CACACAUUA	CAUGGUUC
	2381	UGUCUUUG	CUGAUGA	X	GAA	ACCAUGUA	UACAUGGUU	CAAAGACA
	2382	UUGUCUUU	CUGAUGA	X	GAA	AACCAUGU	ACAUGGUUC	AAAGACAA
	2403	GAAUCUUC	CUGAUGA	X	GAA	ACCAGGGU	ACCCUGGUA	GAAGAUUC
	2410	AAUGCCUG	CUGAUGA	X	GAA	AUCUUCUA	UAGAAGAUU	CAGGCAUU
10	2411	CAAUGCCU	CUGAUGA	X	GAA	AAUCUUCU	AGAAGAUUC	AGGCAUUG
	2418	CUCAGUAC	CUGAUGA	X	GAA	AUGCCUGA	UCAGGCAUU	GUACUGAG
	2421	UCUCUCAG	CUGAUGA	X	GAA	ACAAUGCC	GGCAUUGUA	CUGAGAGA
	2449	CCUGCGGA	CUGAUGA	X	GAA	AGUCAGGU	ACCUGACUA	UCCGCAGG
	2451	ACCCUGCG	CUGAUGA	X	GAA	AUAGUCAG	CUGACUAUC	CGCAGGGU
15	2481	CAGGUGUA	CUGAUGA	X	GAA	AGGCCUCC	GGAGGCCUC	UACACCUG
	2483	GGCAGGUG	CUGAUGA	X	GAA	AGAGGCCU	AGGCCUCUA	CACCUGCC
	2505	CAGCCAAG	CUGAUGA	X	GAA	ACAUUGCA	UGCAAUGUC	CUUGGCUG
	2508	GCACAGCC	CUGAUGA	X	GAA	AGGACAUU	AAUGUCCUU	GGCUGUGC
	2532	AUUAUGAA	CUGAUGA	X	GAA	AGCGUCUC	GAGACGCUC	UUCAUAAU
20	2534	CUAUUAUG	CUGAUGA	X	GAA	AGAGCGUC	GACGCUCUU	CAUAAUAG
	2535	UCUAUUAU	CUGAUGA	X	GAA	AAGAGCGU	ACGCUCUUC	AUAAUAGA
	2538	CCUUCUAU	CUGAUGA	X	GAA	AUGAAGAG	CUCUUCAUA	AUAGAAGG
	2541	GCACCUUC	CUGAUGA	X	GAA	AUUAUGAA	UUCAUAAUA	GAAGGUGC
	2567	UGACUUCC	CUGAUGA	X	GAA	AGUUGGUC	GACCAACUU	GGAAGUCA
25	2574	AGGAUAAU	CUGAUGA	X	GAA	ACUUCCAA	UUGGAAGUC	AUUAUCCU
	2577	ACGAGGAU	CUGAUGA	X	GAA	AUGACUUC	GAAGUCAUU	AUCCUCGU
	2578	GACGAGGA	CUGAUGA	X	GAA	AAUGACUU	AAGUCAUUA	UCCUCGUC
	2580	CCGACGAG	CUGAUGA	X	GAA	AUAAUGAC	GUCAUUAUC	CUCGUCGG
	2583	GUGCCGAC	CUGAUGA	X	GAA	AGGAUAAU	AUUAUCCUC	GUCGGCAC
30	2586	GCAGUGCC	CUGAUGA	X	GAA	ACGAGGAU	AUCCUCGUC	GGCACUGC

2601 AACAUGGC CUGAUGA X GAA AUCACUGC GCAGUGAUU GCCAUGUU
2609 GCCAGAAG CUGAUGA X GAA ACAUGGCA UGCCAUGUU CUUCUGGC
2610 AGCCAGAA CUGAUGA X GAA AACAUGGC GCCAUGUUC UUCUGGCU
2612 GGAGCCAG CUGAUGA X GAA AGAACAUG CAUGUUCUU CUGGCUCC
2613 AGGAGCCA CUGAUGA X GAA AAGAACAU AUGUUCUUC UGGCUCCU
2619 ACAAGAAG CUGAUGA X GAA AGCCAGAA UUCUGGCUC CUUCUUGU
2622 AUGACAAG CUGAUGA X GAA AGGAGCCA UGGCUCCUU CUUGUCAU
2623 AAUGACAA CUGAUGA X GAA AAGGAGCC GGCUCCUUC UUGUCAUU
2625 ACAAUGAC CUGAUGA X GAA AGAAGGAG CUCCUUCUU GUCAUUGU
2628 AGGACAAU CUGAUGA X GAA ACAAGAAG CUUCUUGUC AUUGUCCU
2631 CGUAGGAC CUGAUGA X GAA AUGACAAG CUUGUCAUU GUCCUACG
2634 GUCCGUAG CUGAUGA X GAA ACAAUGAC GUCAUUGUC CUACGGAC
2637 ACGGUCCG CUGAUGA X GAA AGGACAAU AUUGUCCUA CGGACCGU
2646 GCCCGCUU CUGAUGA X GAA ACGGUCCG CGGACCGUU AAGCGGGC
2647 GGCCCGCU CUGAUGA X GAA AACGGUCC GGACCGUUA AGCGGGCC
2681 UAGACAAG CUGAUGA X GAA AGCCUGUC GACAGGCUA CUUGUCUA
2684 CAAUAGAC CUGAUGA X GAA AGUAGCCU AGGCUACUU GUCUAUUG
2687 UGACAAUA CUGAUGA X GAA ACAAGUAG CUACUUGUC UAUUGUCA
2689 CAUGACAA CUGAUGA X GAA AGACAAGU ACUUGUCUA UUGUCAUG
2691 UCCAUGAC CUGAUGA X GAA AUAGACAA UUGUCUAUU GUCAUGGA
2694 GGAUCCAU CUGAUGA X GAA ACAAUAGA UCUAUUGUC AUGGAUCC
2701 UUCAUCUG CUGAUGA X GAA AUCCAUGA UCAUGGAUC CAGAUGAA
2711 CCAAGGGC CUGAUGA X GAA AUUCAUCU AGAUGAAUU GCCCUUGG
2717 GCUCAUCC CUGAUGA X GAA AGGGCAAU AUUGCCCUU GGAUGAGC
2738 CAUAAGGC CUGAUGA X GAA AGCGUUCA UGAACGCUU GCCUUAUG
2743 GGCAUCAU CUGAUGA X GAA AGGCAAGC GCUUGCCUU AUGAUGCC
2744 UGGCAUCA CUGAUGA X GAA AAGGCAAG CUUGCCUUA UGAUGCCA
2765 CCCUGGGG CUGAUGA X GAA AUUCCCAC GUGGGAAUU CCCCAGGG
2766 UCCCUGGG CUGAUGA X GAA AAUUCCCA UGGGAAUUC CCCAGGGA
2787 GGUUUUCC CUGAUGA X GAA AGUUUCAG CUGAAACUA GGAAAACC

	2797	GCGGCCAA	CUGAUGA	X	GAA	AGGUUUUC	GAAAACCUC	UUGGCCGC
	2799	CCGCGGCC	CUGAUGA	X	GAA	AGAGGUUU	AAACCUCUU	GGCCGCGG
	2813	CUUGGCCG	CUGAUGA	X	GAA	AGGCACCG	CGGUGCCUU	CGGCCAAG
	2814	ACUUGGCC	CUGAUGA	X	GAA	AAGGCACC	GGUGCCUUC	GGCCAAGU
5	2826	UCUGCCUC	CUGAUGA	X	GAA	AUCACUUG	CAAGUGAUU	GAGGCAGA
	2839	AAUUCCAA	CUGAUGA	X	GAA	AGCGUCUG	CAGACGCUU	UUGGAAUU
	2840	CAAUUCCA	CUGAUGA	X	GAA	AAGCGUCU	AGACGCUUU	UGGAAUUG
	2841	UCAAUUCC	CUGAUGA	X	GAA	AAAGCGUC	GACGCUUUU	GGAAUUGA
	2847	GUCUUGUC	CUGAUGA	X	GAA	AUUCCAAA	UUUGGAAUU	GACAAGAC
10	2863	UGUUUUGC	CUGAUGA	X	GAA	AGUCGCUG	CAGCGACUU	GCAAAACA
	2874	UUGACGGC	CUGAUGA	X	GAA	ACUGUUUU	AAAACAGUA	GCCGUCAA
	2880	AACAUCUU	CUGAUGA	X	GAA	ACGGCUAC	GUAGCCGUC	AAGAUGUU
	2888	CUUCUUUC	CUGAUGA	X	GAA	ACAUCUUG	CAAGAUGUU	GAAAGAAG
	2917	GAGGGCUC	CUGAUGA	X	GAA	AUGCUCGC	GCGAGCAUC	GAGCCCUC
15	2925	UCAGACAU	CUGAUGA	X	GAA	AGGGCUCG	CGAGCCCUC	AUGUCUGA
	2930	UGAGUUCA	CUGAUGA	X	GAA	ACAUGAGG	CCUCAUGUC	UGAACUCA
	2937	AGGAUCUU	CUGAUGA	X	GAA	AGUUCAGA	UCUGAACUC	AAGAUCCU
	2943	UGGAUGAG	CUGAUGA	X	GAA	AUCUUGAG	CUCAAGAUC	CUCAUCCA
	2946	AUGUGGAU	CUGAUGA	X	GAA	AGGAUCUU	AAGAUCCUC	AUCCACAU
20	2949	CCAAUGUG	CUGAUGA	X	GAA	AUGAGGAU	AUCCUCAUC	CACAUUGG
	2955	UGGUGACC	CUGAUGA	X	GAA	AUGUGGAU	AUCCACAUU	GGUCACCA
	2959	GAGAUGGU	CUGAUGA	X	GAA	ACCAAUGU	ACAUUGGUC	ACCAUCUC
	2965	CACAUUGA	CUGAUGA	X	GAA	AUGGUGAC	GUCACCAUC	UCAAUGUG
	2967	ACCACAUU	CUGAUGA	X	GAA	AGAUGGUG	CACCAUCUC	AAUGUGGU
25	2982	GCGCCUAG	CUGAUGA	X	GAA	AGGUUCAC	GUGAACCUC	CUAGGCGC
	2985	CAGGCGCC	CUGAUGA	X	GAA	AGGAGGUU	AACCUCCUA	GGCGCCUG
	3013	CACCAUGA	CUGAUGA	X	GAA	AGGCCCUC	GAGGGCCUC	UCAUGGUG
	3015	AUCACCAU	CUGAUGA	X	GAA	AGAGGCCC	GGGCCUCUC	AUGGUGAU
	3024	AAUUCCAC	CUGAUGA	X	GAA	AUCACCAU	AUGGUGAUU	GUGGAAUU
30	3032	ACUUGCAG	CUGAUGA	X	GAA	AUUCCACA	UGUGGAAUU	CUGCAAGU

3033 AACUUGCA CUGAUGA X GAA AAUUCCAC GUGGAAUUC UGCAAGUU
3041 GGUUUCCA CUGAUGA X GAA ACUUGCAG CUGCAAGUU UGGAAACC
3042 AGGUUUCC CUGAUGA X GAA AACUUGCA UGCAAGUUU GGAAACCU
3051 UAAGUUGA CUGAUGA X GAA AGGUUUCC GGAAACCUA UCAACUUA
3053 AGUAAGUU CUGAUGA X GAA AUAGGUUU AAACCUAUC AACUUACU
3058 CCGUAAGU CUGAUGA X GAA AGUUGAUA UAUCAACUU ACUUACGG
3059 CCCGUAAG CUGAUGA X GAA AAGUUGAU AUCAACUUA CUUACGGG
3062 UGCCCCGU CUGAUGA X GAA AGUAAGUU AACUUACUU ACGGGGCA
3063 UUGCCCCG CUGAUGA X GAA AAGUAAGU ACUUACUUA CGGGGCAA
3083 AGGGAACA CUGAUGA X GAA AUUCAUUU AAAUGAAUU UGUUCCCU
3084 UAGGGAAC CUGAUGA X GAA AAUUCAUU AAUGAAUUU GUUCCCUA
3087 UUAUAGGG CUGAUGA X GAA ACAAAUUC GAAUUUGUU CCCUAUAA
3088 CUUAUAGG CUGAUGA X GAA AACAAAUU AAUUUGUUC CCUAUAAG
3092 UGCUCUUA CUGAUGA X GAA AGGGAACA UGUUCCCUA UAAGAGCA
3094 UUUGCUCU CUGAUGA X GAA AUAGGGAA UUCCCUAUA AGAGCAAA
3113 CCUGGCGG CUGAUGA X GAA AGCGUGCC GGCACGCUU CCGCCAGG
3114 CCCUGGCG CUGAUGA X GAA AAGCGUGC GCACGCUUC CGCCAGGG
3131 CCCCAACG CUGAUGA X GAA AGUCCUUG CAAGGACUA CGUUGGGG
3135 AGCUCCCC CUGAUGA X GAA ACGUAGUC GACUACGUU GGGGAGCU
3144 UCCACGGA CUGAUGA X GAA AGCUCCCC GGGGAGCUC UCCGUGGA
3146 GAUCCACG CUGAUGA X GAA AGAGCUCC GGAGCUCUC CGUGGAUC
3154 UCUUUUCA CUGAUGA X GAA AUCCACGG CCGUGGAUC UGAAAAGA
3167 UGCUGUCC CUGAUGA X GAA AGCGUCUU AAGACGCUU GGACAGCA
3177 CUGCUGGU CUGAUGA X GAA AUGCUGUC GACAGCAUC ACCAGCAG
3194 AGCUGGCA CUGAUGA X GAA AGCUCUGG CCAGAGCUC UGCCAGCU
3203 CAAAGCCU CUGAUGA X GAA AGCUGGCA UGCCAGCUC AGGCUUUG
3209 CCUCAACA CUGAUGA X GAA AGCCUGAG CUCAGGCUU UGUUGAGG
3210 UCCUCAAC CUGAUGA X GAA AAGCCUGA UCAGGCUUU GUUGAGGA
3213 UUCUCCUC CUGAUGA X GAA ACAAAGCC GGCUUUGUU GAGGAGAA
3224 CACUGAGC CUGAUGA X GAA AUUUCUCC GGAGAAAUC GCUCAGUG

	3228	ACAUCACU	CUGAUGA	X	GAA	AGCGAUUU	AAAUCGCUC	AGUGAUGU
	3237	UCUUCCUC	CUGAUGA	X	GAA	ACAUCACU	AGUGAUGUA	GAGGAAGA
	3253	UUCUUCAG	CUGAUGA	X	GAA	AGCUUCUU	AAGAAGCUU	CUGAAGAA
	3254	GUUCUUCA	CUGAUGA	X	GAA	AAGCUUCU	AGAAGCUUC	UGAAGAAC
5	3266	AGUCCUUG	CUGAUGA	X	GAA	ACAGUUCU	AGAACUGUA	CAAGGACU
	3275	AGGUCAGG	CUGAUGA	X	GAA	AGUCCUUG	CAAGGACUU	CCUGACCU
	3276	AAGGUCAG	CUGAUGA	X	GAA	AAGUCCUU	AAGGACUUC	CUGACCUU
	3284	GAUGCUCC	CUGAUGA	X	GAA	AGGUCAGG	CCUGACCUU	GGAGCAUC
	3292	ACAGAUGA	CUGAUGA	X	GAA	AUGCUCCA	UGGAGCAUC	UCAUCUGU
10	3294	UAACAGAU	CUGAUGA	X	GAA	AGAUGCUC	GAGCAUCUC	AUCUGUUA
	3297	CUGUAACA	CUGAUGA	X	GAA	AUGAGAUG	CAUCUCAUC	UGUUACAG
	3301	GAAGCUGU	CUGAUGA	X	GAA	ACAGAUGA	UCAUCUGUU	ACAGCUUC
	3302	GGAAGCUG	CUGAUGA	X	GAA	AACAGAUG	CAUCUGUUA	CAGCUUCC
	3308	CCACUUGG	CUGAUGA	X	GAA	AGCUGUAA	UUACAGCUU	CCAAGUGG
15	3309	GCCACUUG	CUGAUGA	X	GAA	AAGCUGUA	UACAGCUUC	CAAGUGGC
	3319	CAUGCCCU	CUGAUGA	X	GAA	AGCCACUU	AAGUGGCUA	AGGGCAUG
	3332	AUGCCAAG	CUGAUGA	X	GAA	ACUCCAUG	CAUGGAGUU	CUUGGCAU
	3333	GAUGCCAA	CUGAUGA	X	GAA	AACUCCAU	AUGGAGUUC	UUGGCAUC
	3335	UUGAUGCC	CUGAUGA	X	GAA	AGAACUCC	GGAGUUCUU	GGCAUCAA
20	3341	ACUUCCUU	CUGAUGA	X	GAA	AUGCCAAG	CUUGGCAUC	AAGGAAGU
	3352	CCUGUGGA	CUGAUGA	X	GAA	ACACUUCC	GGAAGUGUA	UCCACAGG
	3354	UCCCUGUG	CUGAUGA	X	GAA	AUACACUU	AAGUGUAUC	CACAGGGA
	3381	GAUAGGAG	CUGAUGA	X	GAA	AUGUUUCG	CGAAACAUU	CUCCUAUC
	3382	CGAUAGGA	CUGAUGA	X	GAA	AAUGUUUC	GAAACAUUC	UCCUAUCG
25	3384	UCCGAUAG	CUGAUGA	X	GAA	AGAAUGUU	AACAUUCUC	CUAUCGGA
	3387	UUCUCCGA	CUGAUGA	X	GAA	AGGAGAAU	AUUCUCCUA	UCGGAGAA
	3389	UCUUCUCC	CUGAUGA	X	GAA	AUAGGAGA	UCUCCUAUC	GGAGAAGA
	3405	CAGAUCUU	CUGAUGA	X	GAA	ACCACAUU	AAUGUGGUU	AAGAUCUG
	3406	ACAGAUCU	CUGAUGA	X	GAA	AACCACAU	AUGUGGUUA	AGAUCUGU
30	3411	AAGUCACA	CUGAUGA	X	GAA	AUCUUAAC	GUUAAGAUC	UGUGACUU

3419 CCAAGCCG CUGAUGA X GAA AGUCACAG CUGUGACUU CGGCUUGG
3420 GCCAAGCC CUGAUGA X GAA AAGUCACA UGUGACUUC GGCUUGGC
3425 CCCGGGCC CUGAUGA X GAA AGCCGAAG CUUCGGCUU GGCCCGGG
3438 UCUUUAUA CUGAUGA X GAA AUGUCCCG CGGGACAUU UAUAAAGA
3439 GUCUUUAU CUGAUGA X GAA AAUGUCCC GGGACAUUU AUAAAGAC
3440 GGUCUUUA CUGAUGA X GAA AAAUGUCC GGACAUUUA UAAAGACC
3442 CGGGUCUU CUGAUGA X GAA AUAAAUGU ACAUUUAUA AAGACCCG
3454 UCUGACAU CUGAUGA X GAA AUCCGGGU ACCCGGAUU AUGUCAGA
3455 UUCUGACA CUGAUGA X GAA AAUCCGGG CCCGGAUUA UGUCAGAA
3459 CCUUUUCU CUGAUGA X GAA ACAUAAUC GAUUAUGUC AGAAAAGG
3480 UUCAAAGG CUGAUGA X GAA AGUCGGGC GCCCGACUC CCUUUGAA
3484 CCACUUCA CUGAUGA X GAA AGGGAGUC GACUCCCUU UGAAGUGG
3485 UCCACUUC CUGAUGA X GAA AAGGGAGU ACUCCCUUU GAAGUGGA
3510 CUGUCAAA CUGAUGA X GAA AUGGUUUC GAAACCAUU UUUGACAG
3511 UCUGUCAA CUGAUGA X GAA AAUGGUUU AAACCAUUU UUGACAGA
3512 CUCUGUCA CUGAUGA X GAA AAAUGGUU AACCAUUUU UGACAGAG
3513 ACUCUGUC CUGAUGA X GAA AAAAUGGU ACCAUUUUU GACAGAGU
3522 AUUGUGUA CUGAUGA X GAA ACUCUGUC GACAGAGUA UACACAAU
3524 GAAUUGUG CUGAUGA X GAA AUACUCUG CAGAGUAUA CACAAUUC
3531 UCGCUCUG CUGAUGA X GAA AUUGUGUA UACACAAUU CAGAGCGA
3532 AUCGCUCU CUGAUGA X GAA AAUUGUGU ACACAAUUC AGAGCGAU
3548 CACCGAAA CUGAUGA X GAA ACCACACA UGUGUGGUC UUUCGGUG
3550 CACACCGA CUGAUGA X GAA AGACCACA UGUGGUCUU UCGGUGUG
3551 ACACACCG CUGAUGA X GAA AAGACCAC GUGGUCUUU CGGUGUGU
3552 AACACACC CUGAUGA X GAA AAAGACCA UGGUCUUUC GGUGUGUU
3560 CCCAGAGC CUGAUGA X GAA ACACACCG CGGUGUGUU GCUCUGGG
3564 AUUUCCCA CUGAUGA X GAA AGCAACAC GUGUUGCUC UGGGAAAU
3573 AAGGAAAA CUGAUGA X GAA AUUUCCCA UGGGAAAUA UUUUCCUU
3575 CUAAGGAA CUGAUGA X GAA AUAUUUCC GGAAAUAUU UUCCUUAG
3576 CCUAAGGA CUGAUGA X GAA AAUAUUUC GAAAUAUUU UCCUUAGG

	3577	ACCUAAGG	CUGAUGA	X	GAA	AAAUAUUU	AAAUAUUUU	CCUUAGGU
	3578	CACCUAAG	CUGAUGA	X	GAA	AAAAUAUU	AAUAUUUUC	CUUAGGUG
	3581	AGGCACCU	CUGAUGA	X	GAA	AGGAAAAU	AUUUUCCUU	AGGUGCCU
	3582	GAGGCACC	CUGAUGA	X	GAA	AAGGAAAA	UUUUCCUUA	GGUGCCUC
5	3590	GGUAUGGG	CUGAUGA	X	GAA	AGGCACCU	AGGUGCCUC	CCCAUACC
	3596	CCCCAGGG	CUGAUGA	X	GAA	AUGGGGAG	CUCCCCAUA	CCCUGGGG
	3606	UCAAUCUU	CUGAUGA	X	GAA	ACCCCAGG	CCUGGGGUC	AAGAUUGA
	3612	UCUUCAUC	CUGAUGA	X	GAA	AUCUUGAC	GUCAAGAUU	GAUGAAGA
	3623	UCCUACAA	CUGAUGA	X	GAA	AUUCUUCA	UGAAGAAUU	UUGUAGGA
10	3624	CUCCUACA	CUGAUGA	X	GAA	AAUUCUUC	GAAGAAUUU	UGUAGGAG
	3625	UCUCCUAC	CUGAUGA	X	GAA	AAAUUCUU	AAGAAUUUU	GUAGGAGA
	3628	CAAUCUCC	CUGAUGA	X	GAA	ACAAAAUU	AAUUUUGUA	GGAGAUUG
	3635	CUUCUUUC	CUGAUGA	X	GAA	AUCUCCUA	UAGGAGAUU	GAAAGAAG
	3649	CCGCAUUC	CUGAUGA	X	GAA	AGUUCCUU	AAGGAACUA	GAAUGCGG
15	3661	GUAGUCAG	CUGAUGA	X	GAA	AGCCCGCA	UGCGGGCUC	CUGACUAC
	3668	GGGUAGUG	CUGAUGA	X	GAA	AGUCAGGA	UCCUGACUA	CACUACCC
	3673	UUCUGGGG	CUGAUGA	X	GAA	AGUGUAGU	ACUACACUA	CCCCAGAA
	3686	UGGUCUGG	CUGAUGA	X	GAA	ACAUUUCU	AGAAAUGUA	CCAGACCA
	3734	CUGAAAAC	CUGAUGA	X	GAA	AGGGUCUC	GAGACCCUC	GUUUUCAG
20	3737	ACUCUGAA	CUGAUGA	X	GAA	ACGAGGGU	ACCCUCGUU	UUCAGAGU
	3738	AACUCUGA	CUGAUGA	X	GAA	AACGAGGG	CCCUCGUUU	UCAGAGUU
	3739	CAACUCUG	CUGAUGA	X	GAA	AAACGAGG	CCUCGUUUU	CAGAGUUG
	3740	CCAACUCU	CUGAUGA	X	GAA	AAAACGAG	CUCGUUUUC	AGAGUUGG
	3746	GCUCCACC	CUGAUGA	X	GAA	ACUCUGAA	UUCAGAGUU	GGUGGAGC
25	3757	GUUUCCCA	CUGAUGA	X	GAA	AUGCUCCA	UGGAGCAUU	UGGGAAAC
	3758	GGUUUCCC	CUGAUGA	X	GAA	AAUGCUCC	GGAGCAUUU	GGGAAACC
	3768	GCUUGCAG	CUGAUGA	X	GAA	AGGUUUCC	GGAAACCUC	CUGCAAGC
	3803	GAACAAUA	CUGAUGA	X	GAA	AGUCUUUG	CAAAGACUA	UAUUGUUC
	3805	AAGAACAA	CUGAUGA	X	GAA	AUAGUCUU	AAGACUAUA	UUGUUCUU
30	3807	GGAAGAAC	CUGAUGA	X	GAA	AUAUAGUC	GACUAUAUU	GUUCUUCC

	3810	AUUGGAAG	CUGAUGA	X	GAA	ACAAUAUA	UAUAUUGUU	CUUCCAAU
	3811	CAUUGGAA	CUGAUGA	X	GAA	AACAAUAU	AUAUUGUUC	UUCCAAUG
	3813	GACAUUGG	CUGAUGA	X	GAA	AGAACAAU	AUUGUUCUU	CCAAUGUC
	3814	UGACAUUG	CUGAUGA	X	GAA	AAGAACAA	UUGUUCUUC	CAAUGUCA
5	3821	GUGUCUCU	CUGAUGA	X	GAA	ACAUUGGA	UCCAAUGUC	AGAGACAC
	3847	GAGUCCAG	CUGAUGA	X	GAA	AUCCUCUU	AAGAGGAUU	CUGGACUC
	3848	AGAGUCCA	CUGAUGA	X	GAA	AAUCCUCU	AGAGGAUUC	UGGACUCU
	3855	GGCAGGGA	CUGAUGA	X	GAA	AGUCCAGA	UCUGGACUC	UCCCUGCC
	3857	UAGGCAGG	CUGAUGA	X	GAA	AGAGUCCA	UGGACUCUC	CCUGCCUA
10	3865	AGGUGAGG	CUGAUGA	X	GAA	AGGCAGGG	CCCUGCCUA	CCUCACCU
	3869	AAACAGGU	CUGAUGA	X	GAA	AGGUAGGC	GCCUACCUC	ACCUGUUU
	3876	AUACAGGA	CUGAUGA	X	GAA	ACAGGUGA	UCACCUGUU	UCCUGUAU
	3877	CAUACAGG	CUGAUGA	X	GAA	AACAGGUG	CACCUGUUU	CCUGUAUG
	3878	CCAUACAG	CUGAUGA	X	GAA	AAACAGGU	ACCUGUUUC	CUGUAUGG
15	3883	UUCCUCCA	CUGAUGA	X	GAA	ACAGGAAA	UUUCCUGUA	UGGAGGAA
	3914	CAUAAUGG	CUGAUGA	X	GAA	AUUUGGGG	CCCCAAAUU	CCAUUAUG
	3915	UCAUAAUG	CUGAUGA	X	GAA	AAUUUGGG	CCCAAAUUC	CAUUAUGA
	3919	GUUGUCAU	CUGAUGA	X	GAA	AUGGAAUU	AAUUCCAUU	AUGACAAC
	3920	UGUUGUCA	CUGAUGA	X	GAA	AAUGGAAU	AUUCCAUUA	UGACAACA
20	3939	UAAUGACU	CUGAUGA	X	GAA	AUUCCUGC	GCAGGAAUC	AGUCAUUA
	3943	GAGAUAAU	CUGAUGA	X	GAA	ACUGAUUC	GAAUCAGUC	AUUAUCUC
	3946	CUGGAGAU	CUGAUGA	X	GAA	AUGACUGA	UCAGUCAUU	AUCUCCAG
	3947	UCUGGAGA	CUGAUGA	X	GAA	AAUGACUG	CAGUCAUUA	UCUCCAGA
	3949	GUUCUGGA	CUGAUGA	X	GAA	AUAAUGAC	GUCAUUAUC	UCCAGAAC
25	3951	CUGUUCUG	CUGAUGA	X	GAA	AGAUAAUG	CAUUAUCUC	CAGAACAG
	3961	CUUUCGCU	CUGAUGA	X	GAA	ACUGUUCU	AGAACAGUA	AGCGAAAG
	3987	AAUGUUUU	CUGAUGA	X	GAA	ACACUCAC	GUGAGUGUA	AAAACAUU
	3995	UAUCUUCA	CUGAUGA	X	GAA	AUGUUUUU	AAAAACAUU	UGAAGAUA
	3996	AUAUCUUC	CUGAUGA	X	GAA	AAUGUUUU	AAAACAUUU	GAAGAUAU
30	4003	CAAUGGGA	CUGAUGA	X	GAA	AUCUUCAA	UUGAAGAUA	UCCCAUUG

4005 UCCAAUGG CUGAUGA X GAA AUAUCUUC GAAGAUAUC CCAUUGGA
4010 GUUCCUCC CUGAUGA X GAA AUGGGAUA UAUCCCAUU GGAGGAAC
4026 AUCACUUU CUGAUGA X GAA ACUUCUGG CCAGAAGUA AAAGUGAU
4035 UCAUCUGG CUGAUGA X GAA AUCACUUU AAAGUGAUC CCAGAUGA
4068 GAUGCAAG CUGAUGA X GAA ACCAUCCC GGGAUGGUC CUUGCAUC
4071 UCUGAUGC CUGAUGA X GAA AGGACCAU AUGGUCCUU GCAUCAGA
4076 GCUCUUCU CUGAUGA X GAA AUGCAAGG CCUUGCAUC AGAAGAGC
4093 GUCUUCCA CUGAUGA X GAA AGUUUUCA UGAAAACUC UGGAAGAC
4112 AUGGAGAU CUGAUGA X GAA AUUUGUUC GAACAAAUU AUCUCCAU
4113 GAUGGAGA CUGAUGA X GAA AAUUUGUU AACAAAUUA UCUCCAUC
4115 AAGAUGGA CUGAUGA X GAA AUAAUUUG CAAAUUAUC UCCAUCUU
4117 AAAAGAUG CUGAUGA X GAA AGAUAAUU AAUUAUCUC CAUCUUUU
4121 CACCAAAA CUGAUGA X GAA AUGGAGAU AUCUCCAUC UUUUGGUG
4123 UCCACCAA CUGAUGA X GAA AGAUGGAG CUCCAUCUU UUGGUGGA
4124 UUCCACCA CUGAUGA X GAA AAGAUGGA UCCAUCUUU UGGUGGAA
4125 AUUCCACC CUGAUGA X GAA AAAGAUGG CCAUCUUUU GGUGGAAU
4144 CCUGCUUU CUGAUGA X GAA ACUGGGCA UGCCCAGUA AAAGCAGG
4157 AGGCCACA CUGAUGA X GAA ACUCCCUG CAGGGAGUC UGUGGCCU
4166 AGCCUUCC CUGAUGA X GAA AGGCCACA UGUGGCCUC GGAAGGCU
4175 UCUGGUUG CUGAUGA X GAA AGCCUUCC GGAAGGCUC CAACCAGA
4193 CAGACUGG CUGAUGA X GAA AGCCACUG CAGUGGCUA CCAGUCUG
4199 GAUACCCA CUGAUGA X GAA ACUGGUAG CUACCAGUC UGGGUAUC
4205 CUGAGUGA CUGAUGA X GAA ACCCAGAC GUCUGGGUA UCACUCAG
4207 AUCUGAGU CUGAUGA X GAA AUACCCAG CUGGGUAUC ACUCAGAU
4211 UGUCAUCU CUGAUGA X GAA AGUGAUAC GUAUCACUC AGAUGACA
4235 CGCUGGAG CUGAUGA X GAA ACACGGUG CACCGUGUA CUCCAGCG
4238 CGUCGCUG CUGAUGA X GAA AGUACACG CGUGUACUC CAGCGACG
4257 AUCUUUAA CUGAUGA X GAA AGUCCUGC GCAGGACUU UUAAAGAU
4258 CAUCUUUA CUGAUGA X GAA AAGUCCUG CAGGACUUU UAAAGAUG
4259 CCAUCUUU CUGAUGA X GAA AAAGUCCU AGGACUUUU AAAGAUGG

4260 ACCAUCUU CUGAUGA X GAA AAAAGUCC GGACUUUUA AAGAUGGU
4281 UCAGCGUG CUGAUGA X GAA ACUGCAGC GCUGCAGUU CACGCUGA
4282 GUCAGCGU CUGAUGA X GAA AACUGCAG CUGCAGUUC ACGCUGAC
4292 UGGUCCCU CUGAUGA X GAA AGUCAGCG CGCUGACUC AGGGACCA
4311 CAGGAGGU CUGAUGA X GAA AGCUGCAG CUGCAGCUC ACCUCCUG
4316 UUAAACAG CUGAUGA X GAA AGGUGAGC GCUCACCUC CUGUUUAA
4321 UCCAUUUA CUGAUGA X GAA ACAGGAGG CCUCCUGUU UAAAUGGA
4322 UUCCAUUU CUGAUGA X GAA AACAGGAG CUCCUGUUU AAAUGGAA
4323 CUUCCAUU CUGAUGA X GAA AAACAGGA UCCUGUUUA AAUGGAAG
4336 CGGGACAG CUGAUGA X GAA ACCACUUC GAAGUGGUC CUGUCCCG
4341 GGAGCCGG CUGAUGA X GAA ACAGGACC GGUCCUGUC CCGGCUCC
4348 UGGGGGCG CUGAUGA X GAA AGCCGGGA UCCCGGCUC CGCCCCCA
4360 AUUUCCAG CUGAUGA X GAA AGUUGGGG CCCCAACUC CUGGAAAU
4369 UCUCUCGU CUGAUGA X GAA AUUUCCAG CUGGAAAUC ACGAGAGA
4387 GAAAAUCU CUGAUGA X GAA AGCAGCAC GUGCUGCUU AGAUUUUC
4388 UGAAAAUC CUGAUGA X GAA AAGCAGCA UGCUGCUUA GAUUUUCA
4392 CACUUGAA CUGAUGA X GAA AUCUAAGC GCUUAGAUU UUCAAGUG
4393 ACACUUGA CUGAUGA X GAA AAUCUAAG CUUAGAUUU UCAAGUGU
4394 AACACUUG CUGAUGA X GAA AAAUCUAA UUAGAUUUU CAAGUGUU
4395 CAACACUU CUGAUGA X GAA AAAAUCUA UAGAUUUUC AAGUGUUG
4402 GAAAGAAC CUGAUGA X GAA ACACUUGA UCAAGUGUU GUUCUUUC
4405 GUGGAAAG CUGAUGA X GAA ACAACACU AGUGUUGUU CUUUCCAC
4406 GGUGGAAA CUGAUGA X GAA AACAACAC GUGUUGUUC UUUCCACC
4408 GUGGUGGA CUGAUGA X GAA AGAACAAC GUUGUUCUU UCCACCAC
4409 GGUGGUGG CUGAUGA X GAA AAGAACAA UUGUUCUUU CCACCACC
4410 GGGUGGUG CUGAUGA X GAA AAAGAACA UGUUCUUUC CACCACCC
4425 AAUGUGGC CUGAUGA X GAA ACUUCCGG CCGGAAGUA GCCACAUU
4433 GAAAAUCA CUGAUGA X GAA AUGUGGCU AGCCACAUU UGAUUUUC
4434 UGAAAAUC CUGAUGA X GAA AAUGUGGC GCCACAUUU GAUUUUCA
4438 AAAAUGAA CUGAUGA X GAA AUCAAAUG CAUUUGAUU UUCAUUUU

4439 AAAAAUGA CUGAUGA X GAA AAUCAAAU AUUUGAUUU UCAUUUUU
4440 CAAAAAUG CUGAUGA X GAA AAAUCAAA UUUGAUUUU CAUUUUUG
4441 CCAAAAAU CUGAUGA X GAA AAAAUCAA UUGAUUUUC AUUUUUGG
4444 CCUCCAAA CUGAUGA X GAA AUGAAAAU AUUUUCAUU UUUGGAGG
4445 UCCUCCAA CUGAUGA X GAA AAUGAAAA UUUUCAUUU UUGGAGGA
4446 CUCCUCCA CUGAUGA X GAA AAAUGAAA UUUCAUUUU UGGAGGAG
4447 CCUCCUCC CUGAUGA X GAA AAAAUGAA UUCAUUUUU GGAGGAGG
4461 UGCAGUCU CUGAUGA X GAA AGGUCCCU AGGGACCUC AGACUGCA
4477 CUGAGGAC CUGAUGA X GAA AGCUCCUU AAGGAGCUU GUCCUCAG
4480 GCCCUGAG CUGAUGA X GAA ACAAGCUC GAGCUUGUC CUCAGGGC
4483 AAUGCCCU CUGAUGA X GAA AGGACAAG CUUGUCCUC AGGGCAUU
4491 UCUCUGGA CUGAUGA X GAA AUGCCCUG CAGGGCAUU UCCAGAGA
4492 UUCUCUGG CUGAUGA X GAA AAUGCCCU AGGGCAUUU CCAGAGAA
4493 CUUCUCUG CUGAUGA X GAA AAAUGCCC GGGCAUUUC CAGAGAAG
4525 GUAGAGUC CUGAUGA X GAA ACACAUUC GAAUGUGUU GACUCUAC
4530 AGAGAGUA CUGAUGA X GAA AGUCAACA UGUUGACUC UACUCUCU
4532 AAAGAGAG CUGAUGA X GAA AGAGUCAA UUGACUCUA CUCUCUUU
4535 GGAAAAGA CUGAUGA X GAA AGUAGAGU ACUCUACUC UCUUUUCC
4537 AUGGAAAA CUGAUGA X GAA AGAGUAGA UCUACUCUC UUUUCCAU
4539 GAAUGGAA CUGAUGA X GAA AGAGAGUA UACUCUCUU UUCCAUUC
4540 UGAAUGGA CUGAUGA X GAA AAGAGAGU ACUCUCUUU UCCAUUCA
4541 AUGAAUGG CUGAUGA X GAA AAAGAGAG CUCUCUUUU CCAUUCAU
4542 AAUGAAUG CUGAUGA X GAA AAAAGAGA UCUCUUUUC CAUUCAUU
4546 UUUAAAUG CUGAUGA X GAA AUGGAAAA UUUUCCAUU CAUUUAAA
4547 UUUUAAAU CUGAUGA X GAA AAUGGAAA UUUCCAUUC AUUUAAAA
4550 GACUUUUA CUGAUGA X GAA AUGAAUGG CCAUUCAUU UAAAAGUC
4551 GGACUUUU CUGAUGA X GAA AAUGAAUG CAUUCAUUU AAAAGUCC
4552 AGGACUUU CUGAUGA X GAA AAAUGAAU AUUCAUUUA AAAGUCCU
4558 UUAUAUAG CUGAUGA X GAA ACUUUUAA UUAAAAGUC CUAUAUAA
4561 ACAUUAUA CUGAUGA X GAA AGGACUUU AAAGUCCUA UAUAAUGU

4563 GCACAUUA CUGAUGA X GAA AUAGGACU AGUCCUAUA UAAUGUGC
4565 GGGCACAU CUGAUGA X GAA AUAUAGGA UCCUAUAUA AUGUGCCC
4583 GGUAGUGA CUGAUGA X GAA ACCACAGC GCUGUGGUC UCACUACC
4585 CUGGUAGU CUGAUGA X GAA AGACCACA UGUGGUCUC ACUACCAG
4589 UUAACUGG CUGAUGA X GAA AGUGAGAC GUCUCACUA CCAGUUAA
4595 UUUGCUUU CUGAUGA X GAA ACUGGUAG CUACCAGUU AAAGCAAA
4596 UUUUGCUU CUGAUGA X GAA AACUGGUA UACCAGUUA AAGCAAAA
4609 GUGUUUGA CUGAUGA X GAA AGUCUUUU AAAAGACUU UCAAACAC
4610 CGUGUUUG CUGAUGA X GAA AAGUCUUU AAAGACUUU CAAACACG
4611 ACGUGUUU CUGAUGA X GAA AAAGUCUU AAGACUUUC AAACACGU
4625 GGAGGACA CUGAUGA X GAA AGUCCACG CGUGGACUC UGUCCUCC
4629 UCUUGGAG CUGAUGA X GAA ACAGAGUC GACUCUGUC CUCCAAGA
4632 ACUUCUUG CUGAUGA X GAA AGGACAGA UCUGUCCUC CAAGAAGU
4654 GUUUCACA CUGAUGA X GAA AGGUGCCG CGGCACCUC UGUGAAAC
4668 GCCCAUUC CUGAUGA X GAA AUCCAGUU AACUGGAUC GAAUGGGC
4683 AACACACA CUGAUGA X GAA AGCAUUGC GCAAUGCUU UGUGUGUU
4684 CAACACAC CUGAUGA X GAA AAGCAUUG CAAUGCUUU GUGUGUUG
4691 CCAUCCUC CUGAUGA X GAA ACACACAA UUGUGUGUU GAGGAUGG
4709 GGCCCUGG CUGAUGA X GAA ACAUCUCA UGAGAUGUC CCAGGGCC
4722 GGUAGACA CUGAUGA X GAA ACUCGGCC GGCCGAGUC UGUCUACC
4726 CCAAGGUA CUGAUGA X GAA ACAGACUC GAGUCUGUC UACCUUGG
4728 CUCCAAGG CUGAUGA X GAA AGACAGAC GUCUGUCUA CCUUGGAG
4732 AAGCCUCC CUGAUGA X GAA AGGUAGAC GUCUACCUU GGAGGCUU
4740 CCUCCACA CUGAUGA X GAA AGCCUCCA UGGAGGCUU UGUGGAGG
4741 UCCUCCAC CUGAUGA X GAA AAGCCUCC GGAGGCUUU GUGGAGGA
4758 UUGGCUCA CUGAUGA X GAA AGCCCGCA UGCGGGCUA UGAGCCAA
4771 CCACACUU CUGAUGA X GAA ACACUUGG CCAAGUGUU AAGUGUGG
4772 CCCACACU CUGAUGA X GAA AACACUUG CAAGUGUUA AGUGUGGG
4811 CUCCGAGC CUGAUGA X GAA ACUUGCGC GCGCAAGUC GCUCGGAG
4815 CGCUCUCC CUGAUGA X GAA AGCGACUU AAGUCGCUC GGAGAGCG

	4826	CAGGCUCC	CUGAUGA	X	GAA	ACCGCUCU	AGAGCGGUU	GGAGCCUG
	4844	GCCAGCAC	CUGAUGA	X	GAA	AUGCAUCU	AGAUGCAUU	GUGCUGGC
	4854	CUCCACCA	CUGAUGA	X	GAA	AGCCAGCA	UGCUGGCUC	UGGUGGAG
	4870	CAGGCCAC	CUGAUGA	X	GAA	AGCCCACC	GGUGGGCUU	GUGGCCUG
5	4880	CGUUUCCU	CUGAUGA	X	GAA	ACAGGCCA	UGGCCUGUC	AGGAAACG
	4908	CAAAACCA	CUGAUGA	X	GAA	ACCCUGCC	GGCAGGGUU	UGGUUUUG
	4909	CCAAAACC	CUGAUGA	X	GAA	AACCCUGC	GCAGGGUUU	GGUUUUGG
	4913	CCUUCCAA	CUGAUGA	X	GAA	ACCAAACC	GGUUUGGUU	UUGGAAGG
	4914	ACCUUCCA	CUGAUGA	X	GAA	AACCAAAC	GUUUGGUUU	UGGAAGGU
10	4915	AACCUUCC	CUGAUGA	X	GAA	AAACCAAA	UUUGGUUUU	GGAAGGUU
	4923	AGCACGCA	CUGAUGA	X	GAA	ACCUUCCA	UGGAAGGUU	UGCGUGCU
	4924	GAGCACGC	CUGAUGA	X	GAA	AACCUUCC	GGAAGGUUU	GCGUGCUC
	4932	ACUGUGAA	CUGAUGA	X	GAA	AGCACGCA	UGCGUGCUC	UUCACAGU
	4934	CGACUGUG	CUGAUGA	X	GAA	AGAGCACG	CGUGCUCUU	CACAGUCG
15	4935	CCGACUGU	CUGAUGA	X	GAA	AAGAGCAC	GUGCUCUUC	ACAGUCGG
	4941	UGUAACCC	CUGAUGA	X	GAA	ACUGUGAA	UUCACAGUC	GGGUUACA
	4946	UCGCCUGU	CUGAUGA	X	GAA	ACCCGACU	AGUCGGGUU	ACAGGCGA
	4947	CUCGCCUG	CUGAUGA	X	GAA	AACCCGAC	GUCGGGUUA	CAGGCGAG
	4957	CCACAGGG	CUGAUGA	X	GAA	ACUCGCCU	AGGCGAGUU	CCCUGUGG
20	4958	GCCACAGG	CUGAUGA	X	GAA	AACUCGCC	GGCGAGUUC	CCUGUGGC
	4969	GAGUAGGA	CUGAUGA	X	GAA	ACGCCACA	UGUGGCGUU	UCCUACUC
	4970	GGAGUAGG	CUGAUGA	X	GAA	AACGCCAC	GUGGCGUUU	CCUACUCC
	4971	AGGAGUAG	CUGAUGA	X	GAA	AAACGCCA	UGGCGUUUC	CUACUCCU
	4974	AUUAGGAG	CUGAUGA	X	GAA	AGGAAACG	CGUUUCCUA	CUCCUAAU
25	4977	CUCAUUAG	CUGAUGA	X	GAA	AGUAGGAA	UUCCUACUC	CUAAUGAG
	4980	ACUCUCAU	CUGAUGA	X	GAA	AGGAGUAG	CUACUCCUA	AUGAGAGU
	4989	CCGGAAGG	CUGAUGA	X	GAA	ACUCUCAU	AUGAGAGUU	CCUUCCGG
	4990	UCCGGAAG	CUGAUGA	X	GAA	AACUCUCA	UGAGAGUUC	CUUCCGGA
	4993	GAGUCCGG	CUGAUGA	X	GAA	AGGAACUC	GAGUUCCUU	CCGGACUC
30	4994	AGAGUCCG	CUGAUGA	X	GAA	AAGGAACU	AGUUCCUUC	CGGACUCU

5001 ACACGUAA CUGAUGA X GAA AGUCCGGA UCCGGACUC UUACGUGU
5003 AGACACGU CUGAUGA X GAA AGAGUCCG CGGACUCUU ACGUGUCU
5004 GAGACACG CUGAUGA X GAA AAGAGUCC GGACUCUUA CGUGUCUC
5010 GGCCAGGA CUGAUGA X GAA ACACGUAA UUACGUGUC UCCUGGCC
5012 CAGGCCAG CUGAUGA X GAA AGACACGU ACGUGUCUC CUGGCCUG
5046 GAAGGAGC CUGAUGA X GAA AGCUGCAU AUGCAGCUU GCUCCUUC
5050 UGAGGAAG CUGAUGA X GAA AGCAAGCU AGCUUGCUC CUUCCUCA
5053 AGAUGAGG CUGAUGA X GAA AGGAGCAA UUGCUCCUU CCUCAUCU
5054 GAGAUGAG CUGAUGA X GAA AAGGAGCA UGCUCCUUC CUCAUCUC
5057 UGAGAGAU CUGAUGA X GAA AGGAAGGA UCCUUCCUC AUCUCUCA
5060 GCCUGAGA CUGAUGA X GAA AUGAGGAA UUCCUCAUC UCUCAGGC
5062 CAGCCUGA CUGAUGA X GAA AGAUGAGG CCUCAUCUC UCAGGCUG
5064 CACAGCCU CUGAUGA X GAA AGAGAUGA UCAUCUCUC AGGCUGUG
5076 UCUGAAUU CUGAUGA X GAA AGGCACAG CUGUGCCUU AAUUCAGA
5077 UUCUGAAU CUGAUGA X GAA AAGGCACA UGUGCCUUA AUUCAGAA
5080 GUGUUCUG CUGAUGA X GAA AUUAAGGC GCCUUAAUU CAGAACAC
5081 GGUGUUCU CUGAUGA X GAA AAUUAAGG CCUUAAUUC AGAACACC
5105 CCUCUGCC CUGAUGA X GAA ACGUUCCU AGGAACGUC GGCAGAGG
5116 CCCGUCAG CUGAUGA X GAA AGCCUCUG CAGAGGCUC CUGACGGG
5135 GUUCUCAC CUGAUGA X GAA AUUCUUCG CGAAGAAUU GUGAGAAC
5156 GAAACCCU CUGAUGA X GAA AGUUUCUG CAGAAACUC AGGGUUUC
5162 CCAGCAGA CUGAUGA X GAA ACCCUGAG CUCAGGGUU UCUGCUGG
5163 CCCAGCAG CUGAUGA X GAA AACCCUGA UCAGGGUUU CUGCUGGG
5164 ACCCAGCA CUGAUGA X GAA AAACCCUG CAGGGUUUC UGCUGGGU
5203 AACCCUCA CUGAUGA X GAA ACCUGCCA UGGCAGGUC UGAGGGUU
5211 UGACAGAG CUGAUGA X GAA ACCCUCAG CUGAGGGUU CUCUGUCA
5212 UUGACAGA CUGAUGA X GAA AACCCUCA UGAGGGUUC UCUGUCAA
5214 ACUUGACA CUGAUGA X GAA AGAACCCU AGGGUUCUC UGUCAAGU
5218 CGCCACUU CUGAUGA X GAA ACAGAGAA UUCUCUGUC AAGUGGCG
5229 UGAGCCUU CUGAUGA X GAA ACCGCCAC GUGGCGGUA AAGGCUCA

	5236	ACCAGCCU	CUGAUGA	X	GAA	AGCCUUUA	UAAAGGCUC	AGGCUGGU
	5247	AGAGGAAG	CUGAUGA	X	GAA	ACACCAGC	GCUGGUGUU	CUUCCUCU
	5248	UAGAGGAA	CUGAUGA	X	GAA	AACACCAG	CUGGUGUUC	UUCCUCUA
	5250	GAUAGAGG	CUGAUGA	X	GAA	AGAACACC	GGUGUUCUU	CCUCUAUC
5	5251	AGAUAGAG	CUGAUGA	X	GAA	AAGAACAC	GUGUUCUUC	CUCUAUCU
	5254	UGGAGAUA	CUGAUGA	X	GAA	AGGAAGAA	UUCUUCCUC	UAUCUCCA
	5256	AGUGGAGA	CUGAUGA	X	GAA	AGAGGAAG	CUUCCUCUA	UCUCCACU
	5258	GGAGUGGA	CUGAUGA	X	GAA	AUAGAGGA	UCCUCUAUC	UCCACUCC
	5260	CAGGAGUG	CUGAUGA	X	GAA	AGAUAGAG	CUCUAUCUC	CACUCCUG
10	5265	CCUGACAG	CUGAUGA	X	GAA	AGUGGAGA	UCUCCACUC	CUGUCAGG
	5270	GGGGGCCU	CUGAUGA	X	GAA	ACAGGAGU	ACUCCUGUC	AGGCCCCC
	5283	AUACUGAG	CUGAUGA	X	GAA	ACUUGGGG	CCCCAAGUC	CUCAGUAU
	5286	AAAAUACU	CUGAUGA	X	GAA	AGGACUUG	CAAGUCCUC	AGUAUUUU
	5290	AGCUAAAA	CUGAUGA	X	GAA	ACUGAGGA	UCCUCAGUA	UUUUAGCU
15	5292	AAAGCUAA	CUGAUGA	X	GAA	AUACUGAG	CUCAGUAUU	UUAGCUUU
	5293	CAAAGCUA	CUGAUGA	X	GAA	AAUACUGA	UCAGUAUUU	UAGCUUUG
	5294	ACAAAGCU	CUGAUGA	X	GAA	AAAUACUG	CAGUAUUUU	AGCUUUGU
	5295	CACAAAGC	CUGAUGA	X	GAA	AAAAUACU	AGUAUUUUA	GCUUUGUG
	5299	AAGCCACA	CUGAUGA	X	GAA	AGCUAAAA	UUUUAGCUU	UGUGGCUU
20	5300	GAAGCCAC	CUGAUGA	X	GAA	AAGCUAAA	UUUAGCUUU	GUGGCUUC
	5307	CCAUCAGG	CUGAUGA	X	GAA	AGCCACAA	UUGUGGCUU	CCUGAUGG
	5308	GCCAUCAG	CUGAUGA	X	GAA	AAGCCACA	UGUGGCUUC	CUGAUGGC
	5325	CCAAUUAA	CUGAUGA	X	GAA	AUUUUUCU	AGAAAAAUC	UUAAUUGG
	5327	AACCAAUU	CUGAUGA	X	GAA	AGAUUUUU	AAAAAUCUU	AAUUGGUU
25	5328	CAACCAAU	CUGAUGA	X	GAA	AAGAUUUU	AAAAUCUUA	AUUGGUUG
	5331	AACCAACC	CUGAUGA	X	GAA	AUUAAGAU	AUCUUAAUU	GGUUGGUU
	5335	AGCAAACC	CUGAUGA	X	GAA	ACCAAUUA	UAAUUGGUU	GGUUUGCU
	5339	GGAGAGCA	CUGAUGA	X	GAA	ACCAACCA	UGGUUGGUU	UGCUCUCC
	5340	UGGAGAGC	CUGAUGA	X	GAA	AACCAACC	GGUUGGUUU	GCUCUCCA
30	5344	UAUCUGGA	CUGAUGA	X	GAA	AGCAAACC	GGUUUGCUC	UCCAGAUA

	5346	AUUAUCUG	CUGAUGA	X	GAA	AGAGCAAA	UUUGCUCUC	CAGAUAAU
	5352	CUAGUGAU	CUGAUGA	X	GAA	AUCUGGAG	CUCCAGAUA	AUCACUAG
	5355	UGGCUAGU	CUGAUGA	X	GAA	AUUAUCUG	CAGAUAAUC	ACUAGCCA
	5359	AAUCUGGC	CUGAUGA	X	GAA	AGUGAUUA	UAAUCACUA	GCCAGAUU
5	5367	AAUUUCGA	CUGAUGA	X	GAA	AUCUGGCU	AGCCAGAUU	UCGAAAUU
	5368	UAAUUUCG	CUGAUGA	X	GAA	AAUCUGGC	GCCAGAUUU	CGAAAUUA
	5369	GUAAUUUC	CUGAUGA	X	GAA	AAAUCUGG	CCAGAUUUC	GAAAUUAC
	5375	UAAAAAGU	CUGAUGA	X	GAA	AUUUCGAA	UUCGAAAUU	ACUUUUUA
	5376	CUAAAAAG	CUGAUGA	X	GAA	AAUUUCGA	UCGAAAUUA	CUUUUUAG
10	5379	CGGCUAAA	CUGAUGA	X	GAA	AGUAAUUU	AAAUUACUU	UUUAGCCG
	5380	UCGGCUAA	CUGAUGA	X	GAA	AAGUAAUU	AAUUACUUU	UUAGCCGA
	5381	CUCGGCUA	CUGAUGA	X	GAA	AAAGUAAU	AUUACUUUU	UAGCCGAG
	5382	CCUCGGCU	CUGAUGA	X	GAA	AAAAGUAA	UUACUUUUU	AGCCGAGG
	5383	ACCUCGGC	CUGAUGA	X	GAA	AAAAAGUA	UACUUUUUA	GCCGAGGU
15	5392	GUUAUCAU	CUGAUGA	X	GAA	ACCUCGGC	GCCGAGGUU	AUGAUAAC
	5393	UGUUAUCA	CUGAUGA	X	GAA	AACCUCGG	CCGAGGUUA	UGAUAACA
	5398	GUAGAUGU	CUGAUGA	X	GAA	AUCAUAAC	GUUAUGAUA	ACAUCUAC
	5403	AUACAGUA	CUGAUGA	X	GAA	AUGUUAUC	GAUAACAUC	UACUGUAU
	5405	GGAUACAG	CUGAUGA	X	GAA	AGAUGUUA	UAACAUCUA	CUGUAUCC
20	5410	CUAAAGGA	CUGAUGA	X	GAA	ACAGUAGA	UCUACUGUA	UCCUUUAG
	5412	UUCUAAAG	CUGAUGA	X	GAA	AUACAGUA	UACUGUAUC	CUUUAGAA
	5415	AAAUUCUA	CUGAUGA	X	GAA	AGGAUACA	UGUAUCCUU	UAGAAUUU
	5416	AAAAUUCU	CUGAUGA	X	GAA	AAGGAUAC	GUAUCCUUU	AGAAUUUU
	5417	UAAAAUUC	CUGAUGA	X	GAA	AAAGGAUA	UAUCCUUUA	GAAUUUUA
25	5422	UAGGUUAA	CUGAUGA	X	GAA	AUUCUAAA	UUUAGAAUU	UUAACCUA
	5423	AUAGGUUA	CUGAUGA	X	GAA	AAUUCUAA	UUAGAAUUU	UAACCUAU
	5424	UAUAGGUU	CUGAUGA	X	GAA	AAAUUCUA	UAGAAUUUU	AACCUAUA
	5425	UUAUAGGU	CUGAUGA	X	GAA	AAAAUUCU	AGAAUUUUA	ACCUAUAA
	5430	UAGUUUUA	CUGAUGA	X	GAA	AGGUUAAA	UUUAACCUA	UAAAACUA
30	5432	CAUAGUUU	CUGAUGA	X	GAA	AUAGGUUA	UAACCUAUA	AAACUAUG

5438	AGUAGACA	CUGAUGA	X	GAA	AGUUUUAU	AUAAAACUA	UGUCUACU
5442	AACCAGUA	CUGAUGA	X	GAA	ACAUAGUU	AACUAUGUC	UACUGGUU
5444	GAAACCAG	CUGAUGA	X	GAA	AGACAUAG	CUAUGUCUA	CUGGUUUC
5450	CAGGCAGA	CUGAUGA	X	GAA	ACCAGUAG	CUACUGGUU	UCUGCCUG
5451	ACAGGCAG	CUGAUGA	X	GAA	AACCAGUA	UACUGGUUU	CUGCCUGU
5452	CACAGGCA	CUGAUGA	X	GAA	AAACCAGU	ACUGGUUUC	UGCCUGUG

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be ≥ 2 base-pairs.

Table VII: Mouse *flk*-1 VEGF Receptor-Hairpin Ribozyme and Substrate Sequences

nt. Position	HP Ribozyme Sequence	Substrate
74	GGGACACA AGAA GGGCCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGGCCCA GAC UGUGUCCC
88	GUUAUCCC AGAA GCGGGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCCGCA GCC GGGAUAAC
105	GGAAUCGG AGAA GCCAGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUGGCU GAC CCGAUUCC
110	UCCGCGGA AGAA GGUCAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGACCC GAU UCCGCGGA
125	CGGCUGUC AGAA GUGUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGACACC GCU GACAGCCG
132	CCAGCCGC AGAA GUCAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUGACA GCC GCGGCUGG
138	CUGGCUCC AGAA GCGGCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGCCGCG GCU GGAGCCAG
175	CAGCGCAA AGAA GGGGAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCCCCG GUC UUGCGCUG
199	GUCACAGA AGAA GUAUGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCAUACC GCC UCUGUGAC
309	CACAGAGC AGAA GCUAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUAGCU GUC GCUCUGUG
342	CCCACAGA AGAA GCUCGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCGAGCC GCC UCUGUGGG
434	UGCAAGUA AGAA GAAGGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCUUCA GAU UACUUGCA
630	UAGACAUA AGAA GUGGAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCCACU GUU UAUGUCUA
655	GAAUGGUG AGAA GUAAUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUUACA GAU CACCAUUC
739	CGACCCUC AGAA GGGGAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCCCCU GCC GAGGGUCG

807	CUGUUUCC AGAA GGAACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUUCCG GAU GGAAACAG
920	ACAUGAUA AGAA GAUAGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUAUCA GUC UAUCAUGU
1002	UUUUCUCC AGAA GAUAGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUAUCU GCC GGAGAAAA
1229	UCUUGAUC AGAA GUCCAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUGGACG GAU GAUCAAGA
1365	AUAUCAGG AGAA GGGUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUACCCA GCU CCUGAUAU
1556	UCUCACCG AGAA GGGGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACCCCA GAU CGGUGAGA
1629	UUGGCGUA AGAA GUGCAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGCACA GUC UACGCCAA
1687	UCUGUAGG AGAA GGCUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAGCCU GCU CCUACAGA
1696	UUGGCCGG AGAA GUAGGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCUACA GAC CCGGCCAA
1796	UUCCUUCA AGAA GGGCAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGCCCU GAU UGAAGGAA
1950	GGCUGGGC AGAA GGUUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCAACCU GCU GCCCAGCC
1953	GUUGGCUG AGAA GCAGGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACCUGCU GCC CAGCCAAC
1985	CAGUGCAC AGAA GGGACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUCCCU GUU GUGCACUG
2055	CCCAUGUG AGAA GAUGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACAUCG GUC CACAUGGG
2082	UUCUUGCA AGAA GGUGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACACCA GUU UGCAAGAA
2208	UUAUCUUG AGAA GAGCAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUGCUCU GCU CAAGAUAA
2252	GGAUGAUG AGAA GUUUGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCAAACA GCU CAUCAUCC
2444	UGCGGAUA AGAA GGUUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAACCU GAC UAUCCGCA
2639	GCUUAACG AGAA GUAGGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCUACG GAC CGUUAAGC

2703	GGCAAUUC AGAA GGAUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAUCCA GAU GAAUUGCC
2777	CUAGUUUC AGAA GGUCCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGGACCG GCU GAAACUAG
2832	CCAAAAGC AGAA GCCUCA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAGGCA GAC GCUUUUGG
3199	AAAGCCUG AGAA GGCAGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUGCCA GCU CAGGCUUU
3278	GCUCCAAG AGAA GGAAGU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUUCCU GAC CUUGGAGC
3304	CACUUGGA AGAA GUAACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUUACA GCU UCCAAGUG
3421	CCGGGCCA AGAA GAAGUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GACUUCG GCU UGGCCCGG
3450	CUGACAUA AGAA GGGUCU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGACCCG GAU UAUGUCAG
3475	CAAAGGGA AGAA GGCAUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUGCCC GAC UCCCUUUG
3663	GUAGUGUA AGAA GGAGCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCUCCU GAC UACACUAC
3689	CCAGCAUG AGAA GGUACA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUACCA GAC CAUGCUGG
3703	CUCAUGCC AGAA GUCCAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGGACU GCU GGCAUGAG
3860	GUGAGGUA AGAA GGGAGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUCCCU GCC UACCUCAC
3873	AUACAGGA AGAA GGUGAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCACCU GUU UCCUGUAU
4038	UGGCUGUC AGAA GGGAUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUCCCA GAU GACAGCCA
4181	AGCCACUG AGAA GGUUGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCAACCA GAC CAGUGGCU
4196	GAUACCCA AGAA GGUAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUACCA GUC UGGGUAUC
4212	UCUGUGUC AGAA GAGUGA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCACUCA GAU GACACAGA
4278	UCAGCGUG AGAA GCAGCA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGCUGCA GUU CACGCUGA

4287	GUCCCUGA AGAA GCGUGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCACGCU GAC UCAGGGAC
4307	AGGAGGUG AGAA GCAGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACUGCA GCU CACCUCCU
4318	UCCAUUUA AGAA GGAGGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACCUCCU GUU UAAAUGGA
4338	GGAGCCGG AGAA GGACCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGUCCU GUC CCGGCUCC
4344	GGGGGCGG AGAA GGGACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUCCCG GCU CCGCCCCC
4349	GAGUUGGG AGAA GAGCCG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGGCUCC GCC CCCAACUC
4383	AAAAUCUA AGAA GCACCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGUGCU GCU UAGAUUUU
4462	UCCUUGCA AGAA GAGGUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GACCUCA GAC UGCAAGGA
4574	GAGACCAC AGAA GGGCAC	ACCAGAGAAACACACGUGUGGUACAUUACCUGGUA	GUGCCCU GCU GUGGUCUC
4626	UCUUGGAG AGAA GAGUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGACUCU GUC CUCCAAGA
4723	CCAAGGUA AGAA GACUCG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGAGUCU GUC UACCUUGG
4823	CAGGCUCC AGAA GCUCUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGAGCG GUU GGAGCCUG
4836	CACAAUGC AGAA GCAGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCUGCA GAU GCAUUGUG
4896	ACCCUGCC AGAA GCCUUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAGGCG GCC GGCAGGGU
4938	UGUAACCC AGAA GUGAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUCACA GUC GGGUUACA
4996	ACGUAAGA AGAA GGAAGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUUCCG GAC UCUUACGU
5042	AAGGAGCA AGAA GCAUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAUGCA GCU UGCUCCUU
5118	UCGGCCCC AGAA GGAGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCUCCU GAC GGGGCCGA
5165	CUCCACCC AGAA GAAACC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUUUCU GCU GGGUGGAG

5310	UUUCUGCC AGAA GGAAGC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCUUCCU GAU GGCAGAAA
5363	AUUUCGAA AGAA GGCUAG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUAGCCA GAU UUCGAAAU
5453	AGCACACA AGAA GAAACC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUUUCU GCC UGUGUGCU

Table VIII: Mouse *flt*-1 VEGF Receptor-Hammerhead Ribozyme and Substrate Sequence

nt. Position	HH Ribozyme Sequence	Substrate
17	GUGAGCAA CUGAUGA X GAA ACGCGGCC	GGCCGCGUC UUGCUCAC
19	UGGUGAGC CUGAUGA X GAA AGACGCGG	CCGCGUCUU GCUCACCA
23	ACCAUGGU CUGAUGA X GAA AGCAAGAC	GUCUUGCUC ACCAUGGU
32	CAGCAGCU CUGAUGA X GAA ACCAUGGU	ACCAUGGUC AGCUGCUG
53	UAAGGCAA CUGAUGA X GAA ACCGCGGU	ACCGCGGUC UUGCCUUA
55	CGUAAGGC CUGAUGA X GAA AGACCGCG	CGCGGUCUU GCCUUACG
60	CAGCGCGU CUGAUGA X GAA AGGCAAGA	UCUUGCCUU ACGCGCUG
61	GCAGCGCG CUGAUGA X GAA AAGGCAAG	CUUGCCUUA CGCGCUGC
71	AGACACCC CUGAUGA X GAA AGCAGCGC	GCGCUGCUC GGGUGUCU
78	GAGAAGCA CUGAUGA X GAA ACACCCGA	UCGGGUGUC UGCUUCUC
83	CCUGUGAG CUGAUGA X GAA AGCAGACA	UGUCUGCUU CUCACAGG
84	UCCUGUGA CUGAUGA X GAA AAGCAGAC	GUCUGCUUC UCACAGGA
86	UAUCCUGU CUGAUGA X GAA AGAAGCAG	CUGCUUCUC ACAGGAUA
94	CUGAGCCA CUGAUGA X GAA AUCCUGUG	CACAGGAUA UGGCUCAG
100	UCGACCCU CUGAUGA X GAA AGCCAUAU	AUAUGGCUC AGGGUCGA
106	UUAACUUC CUGAUGA X GAA ACCCUGAG	CUCAGGGUC GAAGUUAA
112	GCACUUUU CUGAUGA X GAA ACUUCGAC	GUCGAAGUU AAAAGUGC
113	GGCACUUU CUGAUGA X GAA AACUUCGA	UCGAAGUUA AAAGUGCC
132	GCCUUUUA CUGAUGA X GAA ACUCAGUU	AACUGAGUU UAAAAGGC
133	UGCCUUUU CUGAUGA X GAA AACUCAGU	ACUGAGUUU AAAAGGCA
134	GUGCCUUU CUGAUGA X GAA AAACUCAG	CUGAGUUUA AAAGGCAC
152	GCUUGCAU CUGAUGA X GAA ACAUGCUG	CAGCAUGUC AUGCAAGC
171	GAGAAAGA CUGAUGA X GAA AGUCUGGC	GCCAGACUC UCUUUCUC
173	UUGAGAAA CUGAUGA X GAA AGAGUCUG	CAGACUCUC UUUCUCAA
175	ACUUGAGA CUGAUGA X GAA AGAGAGUC	GACUCUCUU UCUCAAGU
176	CACUUGAG CUGAUGA X GAA AAGAGAGU	ACUCUCUUU CUCAAGUG
177	GCACUUGA CUGAUGA X GAA AAAGAGAG	CUCUCUUUC UCAAGUGC

	179	CUGCACUU	CUGAUGA	X	GAA	AGAAAGAG	CUCUUUCUC	AAGUGCAG
	205	GAGACCAU	CUGAUGA	X	GAA	AGUGGGCU	AGCCCACUC	AUGGUCUC
	211	UGGGCAGA	CUGAUGA	X	GAA	ACCAUGAG	CUCAUGGUC	UCUGCCCA
	213	CGUGGGCA	CUGAUGA	X	GAA	AGACCAUG	CAUGGUCUC	UGCCCACG
5	254	GGGGGAGU	CUGAUGA	X	GAA	AUGCUCAG	CUGAGCAUC	ACUCCCCC
	258	CGAUGGGG	CUGAUGA	X	GAA	AGUGAUGC	GCAUCACUC	CCCCAUCG
	265	CACAGGCC	CUGAUGA	X	GAA	AUGGGGGA	UCCCCCAUC	GGCCUGUG
	282	UUGCCUGU	CUGAUGA	X	GAA	AUCCCUCC	GGAGGGAUA	ACAGGCAA
	292	UGCUGCAG	CUGAUGA	X	GAA	AUUGCCUG	CAGGCAAUU	CUGCAGCA
10	293	GUGCUGCA	CUGAUGA	X	GAA	AAUUGCCU	AGGCAAUUC	UGCAGCAC
	304	CCAAGGUC	CUGAUGA	X	GAA	AGGUGCUG	CAGCACCUU	GACCUUGG
	310	CCGUGUCC	CUGAUGA	X	GAA	AGGUCAAG	CUUGACCUU	GGACACGG
	341	CAGGUGUA	CUGAUGA	X	GAA	AGGCCCGU	ACGGGCCUC	UACACCUG
	343	UACAGGUG	CUGAUGA	X	GAA	AGAGGCCC	GGGCCUCUA	CACCUGUA
15	351	GAGGUAUC	CUGAUGA	X	GAA	ACAGGUGU	ACACCUGUA	GAUACCUC
	355	UAGGGAGG	CUGAUGA	X	GAA	AUCUACAG	CUGUAGAUA	CCUCCCUA
	359	GAUGUAGG	CUGAUGA	X	GAA	AGGUAUCU	AGAUACCUC	CCUACAUC
	363	AGUAGAUG	CUGAUGA	X	GAA	AGGGAGGU	ACCUCCCUA	CAUCUACU
	367	UCGAAGUA	CUGAUGA	X	GAA	AUGUAGGG	CCCUACAUC	UACUUCGA
20	369	CUUCGAAG	CUGAUGA	X	GAA	AGAUGUAG	CUACAUCUA	CUUCGAAG
	372	UUUCUUCG	CUGAUGA	X	GAA	AGUAGAUG	CAUCUACUU	CGAAGAAA
	373	UUUUCUUC	CUGAUGA	X	GAA	AAGUAGAU	AUCUACUUC	GAAGAAAA
	394	AGAUUGAA	CUGAUGA	X	GAA	AUUCCGCU	AGCGGAAUC	UUCAAUCU
	396	GUAGAUUG	CUGAUGA	X	GAA	AGAUUCCG	CGGAAUCUU	CAAUCUAC
25	397	UGUAGAUU	CUGAUGA	X	GAA	AAGAUUCC	GGAAUCUUC	AAUCUACA
	401	AAUAUGUA	CUGAUGA	X	GAA	AUUGAAGA	UCUUCAAUC	UACAUAUU
	403	CAAAUAUG	CUGAUGA	X	GAA	AGAUUGAA	UUCAAUCUA	CAUAUUUG
	407	CUAACAAA	CUGAUGA	X	GAA	AUGUAGAU	AUCUACAUA	UUUGUUAG
	409	CACUAACA	CUGAUGA	X	GAA	AUAUGUAG	CUACAUAUU	UGUUAGUG
30	410	UCACUAAC	CUGAUGA	X	GAA	AAUAUGUA	UACAUAUUU	GUUAGUGA
	413	GCAUCACU	CUGAUGA	X	GAA	ACAAAUAU	AUAUUUGUU	AGUGAUGC
	414	UGCAUCAC	CUGAUGA	X	GAA	AACAAAUA	UAUUUGUUA	GUGAUGCA
	429	UAUGAAAG	CUGAUGA	X	GAA	ACUCCCUG	CAGGGAGUC	CUUUCAUA

	432	CUCUAUGA	CUGAUGA	X	GAA	AGGACUCC	GGAGUCCUU	UCAUAGAG
	433	UCUCUAUG	CUGAUGA	X	GAA	AAGGACUC	GAGUCCUUU	CAUAGAGA
	434	AUCUCUAU	CUGAUGA	X	GAA	AAAGGACU	AGUCCUUUC	AUAGAGAU
	437	UGCAUCUC	CUGAUGA	X	GAA	AUGAAAGG	CCUUUCAUA	GAGAUGCA
5	455	AGUUUGGG	CUGAUGA	X	GAA	AUGUCAGU	ACUGACAUA	CCCAAACU
	464	AUGUGCAC	CUGAUGA	X	GAA	AGUUUGGG	CCCAAACUU	GUGCACAU
	491	GGGAUGAU	CUGAUGA	X	GAA	AGCUGUCU	AGACAGCUC	AUCAUCCC
	494	CAGGGGAU	CUGAUGA	X	GAA	AUGAGCUG	CAGCUCAUC	AUCCCCUG
	497	CGGCAGGG	CUGAUGA	X	GAA	AUGAUGAG	CUCAUCAUC	CCCUGCCG
10	514	CGUUGGGU	CUGAUGA	X	GAA	ACGUCACC	GGUGACGUC	ACCCAACG
	524	GUGACUGU	CUGAUGA	X	GAA	ACGUUGGG	CCCAACGUC	ACAGUCAC
	530	UUUAGGGU	CUGAUGA	X	GAA	ACUGUGAC	GUCACAGUC	ACCCUAAA
	536	AACUUUUU	CUGAUGA	X	GAA	AGGGUGAC	GUCACCCUA	AAAAAGUU
	544	CAAAUGGA	CUGAUGA	X	GAA	ACUUUUUU	AAAAAAGUU	UCCAUUUG
15	545	UCAAAUGG	CUGAUGA	X	GAA	AACUUUUU	AAAAAGUUU	CCAUUUGA
	546	AUCAAAUG	CUGAUGA	X	GAA	AAACUUUU	AAAAGUUUC	CAUUUGAU
	550	GAGUAUCA	CUGAUGA	X	GAA	AUGGAAAC	GUUUCCAUU	UGAUACUC
	551	AGAGUAUC	CUGAUGA	X	GAA	AAUGGAAA	UUUCCAUUU	GAUACUCU
	555	GGUAAGAG	CUGAUGA	X	GAA	AUCAAAUG	CAUUUGAUA	CUCUUACC
20	558	AGGGGUAA	CUGAUGA	X	GAA	AGUAUCAA	UUGAUACUC	UUACCCCU
	560	UCAGGGGU	CUGAUGA	X	GAA	AGAGUAUC	GAUACUCUU	ACCCCUGA
	561	AUCAGGGG	CUGAUGA	X	GAA	AAGAGUAU	AUACUCUUA	CCCCUGAU
	581	UCCCAUGU	CUGAUGA	X	GAA	AUUCUUUG	CAAAGAAUA	ACAUGGGA
	594	GCCUCUCC	CUGAUGA	X	GAA	ACUGUCCC	GGGACAGUA	GGAGAGGC
25	604	CUAUUAUA	CUGAUGA	X	GAA	AGCCUCUC	GAGAGGCUU	UAUAAUAG
	605	GCUAUUAU	CUGAUGA	X	GAA	AAGCCUCU	AGAGGCUUU	AUAAUAGC
	606	UGCUAUUA	CUGAUGA	X	GAA	AAAGCCUC	GAGGCUUUA	UAAUAGCA
	608	UUUGCUAU	CUGAUGA	X	GAA	AUAAAGCC	GGCUUUAUA	AUAGCAAA
	611	GCAUUUGC	CUGAUGA	X	GAA	AUUAUAAA	UUUAUAAUA	GCAAAUGC
30	625	UCUCUUUG	CUGAUGA	X	GAA	ACGUUGCA	UGCAACGUA	CAAAGAGA
	635	AGCAGUCC	CUGAUGA	X	GAA	AUCUCUUU	AAAGAGAUA	GGACUGCU
	662	UGCCCGUU	CUGAUGA	X	GAA	ACGGUGGC	GCCACCGUC	AACGGGCA
	676	UUGUCUGG	CUGAUGA	X	GAA	ACAGGUGC	GCACCUGUA	CCAGACAA

688	GGGUCAGA CUGAUGA X GAA	AGUUUGUC	GACAAACUA UCUGACCC
690	AUGGGUCA CUGAUGA X GAA	AUAGUUUG	CAAACUAUC UGACCCAU
699	GGUCUGCC CUGAUGA X GAA	AUGGGUCA	UGACCCAUC GGCAGACC
711	UAGGAUUG CUGAUGA X GAA	AUUGGUCU	AGACCAAUA CAAUCCUA
716	ACAUCUAG CUGAUGA X GAA	AUUGUAUU	AAUACAAUC CUAGAUGU
719	UGGACAUC CUGAUGA X GAA	AGGAUUGU	ACAAUCCUA GAUGUCCA
725	CGUAUUUG CUGAUGA X GAA	ACAUCUAG	CUAGAUGUC CAAAUACG
731	GGCGGGCG CUGAUGA X GAA	AUUUGGAC	GUCCAAAUA CGCCCGCC
758	UGCCCGUG CUGAUGA X GAA	AGCAGUCU	AGACUGCUC CACGGGCA
771	GAGGACAA CUGAUGA X GAA	AGUCUGCC	GGCAGACUC UUGUCCUC
773	UUGAGGAC CUGAUGA X GAA	AGAGUCUG	CAGACUCUU GUCCUCAA
776	CAGUUGAG CUGAUGA X GAA	ACAAGAGU	ACUCUUGUC CUCAACUG
779	GUGCAGUU CUGAUGA X GAA	AGGACAAG	CUUGUCCUC AACUGCAC
803	CUCGUAUU CUGAUGA X GAA	AGCUCCGU	ACGGAGCUC AAUACGAG
807	CACCCUCG CUGAUGA X GAA	AUUGAGCU	AGCUCAAUA CGAGGGUG
831	ACCAGGGU CUGAUGA X GAA	AUUCCAGC	GCUGGAAUU ACCCUGGU
832	UACCAGGG CUGAUGA X GAA	AAUUCCAG	CUGGAAUUA CCCUGGUA
840	AGUUGCUU CUGAUGA X GAA	ACCAGGGU	ACCCUGGUA AAGCAACU
849	UGCUCUCU CUGAUGA X GAA	AGUUGCUU	AAGCAACUA AGAGAGCA
859	GCCUUAUA CUGAUGA X GAA	AUGCUCUC	GAGAGCAUC UAUAAGGC
861	CUGCCUUA CUGAUGA X GAA	AGAUGCUC	GAGCAUCUA UAAGGCAG
863	CGCUGCCU CUGAUGA X GAA	AUAGAUGC	GCAUCUAUA AGGCAGCG
875	CUCCGGUC CUGAUGA X GAA	AUCCGCUG	CAGCGGAUU GACCGGAG
888	GUUGUGGG CUGAUGA X GAA	AUGGCUCC	GGAGCCAUU CCCACAAC
889	UGUUGUGG CUGAUGA X GAA	AAUGGCUC	GAGCCAUUC CCACAACA
904	CACUGUGG CUGAUGA X GAA	ACACAUUG	CAAUGUGUU CCACAGUG
905	ACACUGUG CUGAUGA X GAA	AACACAUU	AAUGUGUUC CACAGUGU
914	AUCUUAAG CUGAUGA X GAA	ACACUGUG	CACAGUGUU CUUAAGAU
915	GAUCUUAA CUGAUGA X GAA	AACACUGU	ACAGUGUUC UUAAGAUC
917	UUGAUCUU CUGAUGA X GAA	AGAACACU	AGUGUUCUU AAGAUCAA
918	GUUGAUCU CUGAUGA X GAA	AAGAACAC	GUGUUCUUA AGAUCAAC
923	ACAUUGUU CUGAUGA X GAA	AUCUUAAG	CUUAAGAUC AACAAUGU
953	CAGGUGUA CUGAUGA X GAA	AGCCCCUU	AAGGGGCUC UACACCUG

	955	GACAGGUG	CUGAUGA	X	GAA	AGAGCCCC	GGGGCUCUA	CACCUGUC
	963	CUUCACGC	CUGAUGA	X	GAA	ACAGGUGU	ACACCUGUC	GCGUGAAG
	979	GGAACGAG	CUGAUGA	X	GAA	ACCCACUC	GAGUGGGUC	CUCGUUCC
	982	ACUGGAAC	CUGAUGA	X	GAA	AGGACCCA	UGGGUCCUC	GUUCCAGU
5	985	AAGACUGG	CUGAUGA	X	GAA	ACGAGGAC	GUCCUCGUU	CCAGUCUU
	986	AAAGACUG	CUGAUGA	X	GAA	AACGAGGA	UCCUCGUUC	CAGUCUUU
	991	UGUUGAAA	CUGAUGA	X	GAA	ACUGGAAC	GUUCCAGUC	UUUCAACA
	993	GGUGUUGA	CUGAUGA	X	GAA	AGACUGGA	UCCAGUCUU	UCAACACC
	994	AGGUGUUG	CUGAUGA	X	GAA	AAGACUGG	CCAGUCUUU	CAACACCU
10	995	GAGGUGUU	CUGAUGA	X	GAA	AAAGACUG	CAGUCUUUC	AACACCUC
	1003	CAUGCACG	CUGAUGA	X	GAA	AGGUGUUG	CAACACCUC	CGUGCAUG
	1015	CUUUUUCA	CUGAUGA	X	GAA	ACACAUGC	GCAUGUGUA	UGAAAAAG
	1027	CACUGAUG	CUGAUGA	X	GAA	AUCCUUUU	AAAAGGAUU	CAUCAGUG
	1028	ACACUGAU	CUGAUGA	X	GAA	AAUCCUUU	AAAGGAUUC	AUCAGUGU
15	1031	UUCACACU	CUGAUGA	X	GAA	AUGAAUCC	GGAUUCAUC	AGUGUGAA
	1044	CUGCAUCC	CUGAUGA	X	GAA	AUGUUUCA	UGAAACAUC	GGAAGCAG
	1084	GCCGAUAG	CUGAUGA	X	GAA	ACCGUCUU	AAGACGGUC	CUAUCGGC
	1087	ACAGCCGA	CUGAUGA	X	GAA	AGGACCGU	ACGGUCCUA	UCGGCUGU
	1089	GGACAGCC	CUGAUGA	X	GAA	AUAGGACC	GGUCCUAUC	GGCUGUCC
20	1096	CUUUCAUG	CUGAUGA	X	GAA	ACAGCCGA	UCGGCUGUC	CAUGAAAG
	1114	GGGAGGGG	CUGAUGA	X	GAA	AGGCCUUC	GAAGGCCUU	CCCCUCCC
	1115	GGGGAGGG	CUGAUGA	X	GAA	AAGGCCUU	AAGGCCUUC	CCCUCCCC
	1120	UUUCUGGG	CUGAUGA	X	GAA	AGGGGAAG	CUUCCCCUC	CCCAGAAA
	1130	AACCAUAC	CUGAUGA	X	GAA	AUUUCUGG	CCAGAAAUC	GUAUGGUU
25	1133	UUUAACCA	CUGAUGA	X	GAA	ACGAUUUC	GAAAUCGUA	UGGUUAAA
	1138	CAUCUUUU	CUGAUGA	X	GAA	ACCAUACG	CGUAUGGUU	AAAAGAUG
	1139	CCAUCUUU	CUGAUGA	X	GAA	AACCAUAC	GUAUGGUUA	AAAGAUGG
	1150	UUGCAGGC	CUGAUGA	X	GAA	AGCCAUCU	AGAUGGCUC	GCCUGCAA
	1162	CAGACUUC	CUGAUGA	X	GAA	AUGUUGCA	UGCAACAUU	GAAGUCUG
30	1168	AGCGAGCA	CUGAUGA	X	GAA	ACUUCAAU	AUUGAAGUC	UGCUCGCU
	1173	CAAAUAGC	CUGAUGA	X	GAA	AGCAGACU	AGUCUGCUC	GCUAUUUG
	1177	GUACCAAA	CUGAUGA	X	GAA	AGCGAGCA	UGCUCGCUA	UUUGGUAC
	1179	AUGUACCA	CUGAUGA	X	GAA	AUAGCGAG	CUCGCUAUU	UGGUACAU

1180	CAUGUACC CUGAUGA X GAA AAUAGCGA	UCGCUAUUU GGUACAUG
1184	UAGCCAUG CUGAUGA X GAA ACCAAAUA	UAUUUGGUA CAUGGCUA
1192	UUAAUGAG CUGAUGA X GAA AGCCAUGU	ACAUGGCUA CUCAUUAA
1195	UAAUUAAU CUGAUGA X GAA AGUAGCCA	UGGCUACUC AUUAAUUA
1198	UGAUAAUU CUGAUGA X GAA AUGAGUAG	CUACUCAUU AAUUAUCA
1199	UUGAUAAU CUGAUGA X GAA AAUGAGUA	UACUCAUUA AUUAUCAA
1202	UCUUUGAU CUGAUGA X GAA AUUAAUGA	UCAUUAAUU AUCAAAGA
1203	AUCUUUGA CUGAUGA X GAA AAUUAAUG	CAUUAAUUA UCAAAGAU
1205	ACAUCUUU CUGAUGA X GAA AUAAUUAA	UUAAUUAUC AAAGAUGU
1237	AGAUCGUA CUGAUGA X GAA AGUCCCCU	AGGGGACUA UACGAUCU
1239	CAAGAUCG CUGAUGA X GAA AUAGUCCC	GGGACUAUA CGAUCUUG
1244	CCCAGCAA CUGAUGA X GAA AUCGUAUA	UAUACGAUC UUGCUGGG
1246	UGCCCAGC CUGAUGA X GAA AGAUCGUA	UACGAUCUU GCUGGGCA
1256	GACUGCUU CUGAUGA X GAA AUGCCCAG	CUGGGCAUA AAGCAGUC
1264	AUAGCCUU CUGAUGA X GAA ACUGCUUU	AAAGCAGUC AAGGCUAU
1271	UUUUUAAA CUGAUGA X GAA AGCCUUGA	UCAAGGCUA UUUAAAAA
1273	GGUUUUUA CUGAUGA X GAA AUAGCCUU	AAGGCUAUU UAAAAACC
1274	AGGUUUUU CUGAUGA X GAA AAUAGCCU	AGGCUAUUU AAAAACCU
1275	GAGGUUUU CUGAUGA X GAA AAAUAGCC	GGCUAUUUA AAAACCUC
1283	GUGGCAGU CUGAUGA X GAA AGGUUUUU	AAAAACCUC ACUGCCAC
1293	UACAAUGA CUGAUGA X GAA AGUGGCAG	CUGCCACUC UCAUUGUA
1295	UUUACAAU CUGAUGA X GAA AGAGUGGC	GCCACUCUC AUUGUAAA
1298	ACGUUUAC CUGAUGA X GAA AUGAGAGU	ACUCUCAUU GUAAACGU
1301	UUCACGUU CUGAUGA X GAA ACAAUGAG	CUCAUUGUA AACGUGAA
1314	GUAGAUCU CUGAUGA X GAA AGGUUUCA	UGAAACCUC AGAUCUAC
1319	UUUUCGUA CUGAUGA X GAA AUCUGAGG	CCUCAGAUC UACGAAAA
1321	ACUUUUCG CUGAUGA X GAA AGAUCUGA	UCAGAUCUA CGAAAAGU
1330	AGGACACG CUGAUGA X GAA ACUUUUCG	CGAAAAGUC CGUGUCCU
1336	GAAGCGAG CUGAUGA X GAA ACACGGAC	GUCCGUGUC CUCGCUUC
1339	UUGGAAGC CUGAUGA X GAA AGGACACG	CGUGUCCUC GCUUCCAA
1343	GGGCUUGG CUGAUGA X GAA AGCGAGGA	UCCUCGCUU CCAAGCCC
1344	UGGGCUUG CUGAUGA X GAA AAGCGAGG	CCUCGCUUC CAAGCCCA
1356	CGGAUAGA CUGAUGA X GAA AGGUGGGC	GCCCACCUC UCUAUCCG

	1358	AGCGGAUA	CUGAUGA	X	GAA	AGAGGUGG	CCACCUCUC	UAUCCGCU
	1360	CCAGCGGA	CUGAUGA	X	GAA	AGAGAGGU	ACCUCUCUA	UCCGCUGG
	1362	GCCCAGCG	CUGAUGA	X	GAA	AUAGAGAG	CUCUCUAUC	CGCUGGGC
	1382	CAAGUGAG	CUGAUGA	X	GAA	ACUUGUCU	AGACAAGUC	CUCACUUG
5	1385	GUGCAAGU	CUGAUGA	X	GAA	AGGACUUG	CAAGUCCUC	ACUUGCAC
	1389	CACGGUGC	CUGAUGA	X	GAA	AGUGAGGA	UCCUCACUU	GCACCGUG
	1399	GGAUGCCA	CUGAUGA	X	GAA	ACACGGUG	CACCGUGUA	UGGCAUCC
	1406	GGCCGAGG	CUGAUGA	X	GAA	AUGCCAUA	UAUGGCAUC	CCUCGGCC
	1410	UGUUGGCC	CUGAUGA	X	GAA	AGGGAUGC	GCAUCCCUC	GGCCAACA
10	1421	AGCCACGU	CUGAUGA	X	GAA	AUUGUUGG	CCAACAAUC	ACGUGGCU
	1430	GGGUGCCA	CUGAUGA	X	GAA	AGCCACGU	ACGUGGCUC	UGGCACCC
	1443	AUUGUGGU	CUGAUGA	X	GAA	ACAGGGGU	ACCCCUGUC	ACCACAAU
	1452	UUUGGAGU	CUGAUGA	X	GAA	AUUGUGGU	ACCACAAUC	ACUCCAAA
	1456	UUUCUUUG	CUGAUGA	X	GAA	AGUGAUUG	CAAUCACUC	CAAAGAAA
15	1468	AGAAGUCA	CUGAUGA	X	GAA	ACCUUUCU	AGAAAGGUA	UGACUUCU
	1474	CAGUGCAG	CUGAUGA	X	GAA	AGUCAUAC	GUAUGACUU	CUGCACUG
	1475	UCAGUGCA	CUGAUGA	X	GAA	AAGUCAUA	UAUGACUUC	UGCACUGA
	1495	GGAUAAAG	CUGAUGA	X	GAA	AUUCUUCA	UGAAGAAUC	CUUUAUCC
	1498	CCAGGAUA	CUGAUGA	X	GAA	AGGAUUCU	AGAAUCCUU	UAUCCUGG
20	1499	UCCAGGAU	CUGAUGA	X	GAA	AAGGAUUC	GAAUCCUUU	AUCCUGGA
	1500	AUCCAGGA	CUGAUGA	X	GAA	AAAGGAUU	AAUCCUUUA	UCCUGGAU
	1502	GGAUCCAG	CUGAUGA	X	GAA	AUAAAGGA	UCCUUUAUC	CUGGAUCC
	1509	GCUGCUGG	CUGAUGA	X	GAA	AUCCAGGA	UCCUGGAUC	CCAGCAGC
	1522	UGUUUCCU	CUGAUGA	X	GAA	AGUUGCUG	CAGCAACUU	AGGAAACA
25	1523	CUGUUUCC	CUGAUGA	X	GAA	AAGUUGCU	AGCAACUUA	GGAAACAG
	1535	AUGCUCUC	CUGAUGA	X	GAA	AUUCUGUU	AACAGAAUU	GAGAGCAU
	1544	CGCUGAGA	CUGAUGA	X	GAA	AUGCUCUC	GAGAGCAUC	UCUCAGCG
	1546	UGCGCUGA	CUGAUGA	X	GAA	AGAUGCUC	GAGCAUCUC	UCAGCGCA
	1548	CAUGCGCU	CUGAUGA	X	GAA	AGAGAUGC	GCAUCUCUC	AGCGCAUG
30	1562	CCUUCUAU	CUGAUGA	X	GAA	ACCGUCAU	AUGACGGUC	AUAGAAGG
	1565	GUUCCUUC	CUGAUGA	X	GAA	AUGACCGU	ACGGUCAUA	GAAGGAAC
	1578	AACCGUCU	CUGAUGA	X	GAA	AUUUGUUC	GAACAAAUA	AGACGGUU
	1586	AAUGUGCU	CUGAUGA	X	GAA	ACCGUCUU	AAGACGGUU	AGCACAUU

	1587	CAAUGUGC	CUGAUGA	X	GAA	AACCGUCU	AGACGGUUA	GCACAUUG
	1594	CCACCACC	CUGAUGA	X	GAA	AUGUGCUA	UAGCACAUU	GGUGGUGG
	1609	GGGUCUGA	CUGAUGA	X	GAA	AGUCAGCC	GGCUGACUC	UCAGACCC
	1611	AGGGGUCU	CUGAUGA	X	GAA	AGAGUCAG	CUGACUCUC	AGACCCCU
5	1625	CAGCUGUA	CUGAUGA	X	GAA	AUUCCAGG	CCUGGAAUC	UACAGCUG
	1627	GGCAGCUG	CUGAUGA	X	GAA	AGAUUCCA	UGGAAUCUA	CAGCUGCC
	1642	UUUUAUUG	CUGAUGA	X	GAA	AGGCCCGG	CCGGGCCUU	CAAUAAAA
	1643	AUUUUAUU	CUGAUGA	X	GAA	AAGGCCCG	CGGGCCUUC	AAUAAAAU
	1647	CCCUAUUU	CUGAUGA	X	GAA	AUUGAAGG	CCUUCAAUA	AAAUAGGG
10	1652	ACAGUCCC	CUGAUGA	X	GAA	AUUUUAUU	AAUAAAAUA	GGGACUGU
	1673	UAAAAUUU	CUGAUGA	X	GAA	AUGUUUCU	AGAAACAUA	AAAUUUUA
	1678	UGACAUAA	CUGAUGA	X	GAA	AUUUUAUG	CAUAAAAUU	UUAUGUCA
	1679	GUGACAUA	CUGAUGA	X	GAA	AAUUUUAU	AUAAAAUUU	UAUGUCAC
	1680	UGUGACAU	CUGAUGA	X	GAA	AAAUUUUA	UAAAAUUUU	AUGUCACA
15	1681	CUGUGACA	CUGAUGA	X	GAA	AAAAUUUU	AAAAUUUUA	UGUCACAG
	1685	ACAUCUGU	CUGAUGA	X	GAA	ACAUAAAA	UUUUAUGUC	ACAGAUGU
	1705	AAACGUGA	CUGAUGA	X	GAA	AGCCAUUC	GAAUGGCUU	UCACGUUU
	1706	GAAACGUG	CUGAUGA	X	GAA	AAGCCAUU	AAUGGCUUU	CACGUUUC
	1707	GGAAACGU	CUGAUGA	X	GAA	AAAGCCAU	AUGGCUUUC	ACGUUUCC
20	1712	UCCAAGGA	CUGAUGA	X	GAA	ACGUGAAA	UUUCACGUU	UCCUUGGA
	1713	UUCCAAGG	CUGAUGA	X	GAA	AACGUGAA	UUCACGUUU	CCUUGGAA
	1714	UUUCCAAG	CUGAUGA	X	GAA	AAACGUGA	UCACGUUUC	CUUGGAAA
	1717	UCUUUUCC	CUGAUGA	X	GAA	AGGAAACG	CGUUUCCUU	GGAAAAGA
	1756	CCACACAG	CUGAUGA	X	GAA	ACAGUUUC	GAAACUGUC	CUGUGUGG
25	1766	AAUUUAUU	CUGAUGA	X	GAA	ACCACACA	UGUGUGGUC	AAUAAAUU
	1770	CAGGAAUU	CUGAUGA	X	GAA	AUUGACCA	UGGUCAAUA	AAUUCCUG
	1774	UGUACAGG	CUGAUGA	X	GAA	AUUUAUUG	CAAUAAAUU	CCUGUACA
	1775	CUGUACAG	CUGAUGA	X	GAA	AAUUUAUU	AAUAAAUUC	CUGUACAG
	1780	UGUCUCUG	CUGAUGA	X	GAA	ACAGGAAU	AUUCCUGUA	CAGAGACA
30	1790	AUCCAGGU	CUGAUGA	X	GAA	AUGUCUCU	AGAGACAUU	ACCUGGAU
	1791	AAUCCAGG	CUGAUGA	X	GAA	AAUGUCUC	GAGACAUUA	CCUGGAUU
	1799	CGUAGCAG	CUGAUGA	X	GAA	AUCCAGGU	ACCUGGAUU	CUGCUACG
	1800	CCGUAGCA	CUGAUGA	X	GAA	AAUCCAGG	CCUGGAUUC	UGCUACGG

	1805	ACUGUCCG	CUGAUGA	X	GAA	AGCAGAAU	AUUCUGCUA	CGGACAGU
	1814	CUGUUGUU	CUGAUGA	X	GAA	ACUGUCCG	CGGACAGUU	AACAACAG
	1815	UCUGUUGU	CUGAUGA	X	GAA	AACUGUCC	GGACAGUUA	ACAACAGA
	1836	GCUGAUAC	CUGAUGA	X	GAA	AUGGUGCA	UGCACCAUA	GUAUCAGC
5	1839	CUUGCUGA	CUGAUGA	X	GAA	ACUAUGGU	ACCAUAGUA	UCAGCAAG
	1841	UGCUUGCU	CUGAUGA	X	GAA	AUACUAUG	CAUAGUAUC	AGCAAGCA
	1866	GUAAUCUU	CUGAUGA	X	GAA	AGUGGUGG	CCACCACUC	AAGAUUAC
	1872	GAUGGAGU	CUGAUGA	X	GAA	AUCUUGAG	CUCAAGAUU	ACUCCAUC
	1873	UGAUGGAG	CUGAUGA	X	GAA	AAUCUUGA	UCAAGAUUA	CUCCAUCA
10	1876	GAGUGAUG	CUGAUGA	X	GAA	AGUAAUCU	AGAUUACUC	CAUCACUC
	1880	UUCAGAGU	CUGAUGA	X	GAA	AUGGAGUA	UACUCCAUC	ACUCUGAA
	1884	AAGGUUCA	CUGAUGA	X	GAA	AGUGAUGG	CCAUCACUC	UGAACCUU
	1892	UUGAUGAC	CUGAUGA	X	GAA	AGGUUCAG	CUGAACCUU	GUCAUCAA
	1895	UUCUUGAU	CUGAUGA	X	GAA	ACAAGGUU	AACCUUGUC	AUCAAGAA
15	1898	ACGUUCUU	CUGAUGA	X	GAA	AUGACAAG	CUUGUCAUC	AAGAACGU
	1909	CUUCUAGA	CUGAUGA	X	GAA	ACACGUUC	GAACGUGUC	UCUAGAAG
	1911	GUCUUCUA	CUGAUGA	X	GAA	AGACACGU	ACGUGUCUC	UAGAAGAC
	1913	GAGUCUUC	CUGAUGA	X	GAA	AGAGACAC	GUGUCUCUA	GAAGACUC
	1921	AGGUGCCC	CUGAUGA	X	GAA	AGUCUUCU	AGAAGACUC	GGGCACCU
20	1930	UGCACGCA	CUGAUGA	X	GAA	AGGUGCCC	GGGCACCUA	UGCGUGCA
	1952	CCUGUGUA	CUGAUGA	X	GAA	AUGUUCCU	AGGAACAUA	UACACAGG
	1954	CCCCUGUG	CUGAUGA	X	GAA	AUAUGUUC	GAACAUAUA	CACAGGGG
	1970	UUCCGAAG	CUGAUGA	X	GAA	AUGUCUUC	GAAGACAUC	CUUCGGAA
	1973	GUCUUCCG	CUGAUGA	X	GAA	AGGAUGUC	GACAUCCUU	CGGAAGAC
25	1974	UGUCUUCC	CUGAUGA	X	GAA	AAGGAUGU	ACAUCCUUC	GGAAGACA
	1988	CUAACGAG	CUGAUGA	X	GAA	ACUUCUGU	ACAGAAGUU	CUCGUUAG
	1989	UCUAACGA	CUGAUGA	X	GAA	AACUUCUG	CAGAAGUUC	UCGUUAGA
	1991	UCUCUAAC	CUGAUGA	X	GAA	AGAACUUC	GAAGUUCUC	GUUAGAGA
	1994	GAAUCUCU	CUGAUGA	X	GAA	ACGAGAAC	GUUCUCGUU	AGAGAUUC
30	1995	CGAAUCUC	CUGAUGA	X	GAA	AACGAGAA	UUCUCGUUA	GAGAUUCG
	2001	CGCUUCCG	CUGAUGA	X	GAA	AUCUCUAA	UUAGAGAUU	CGGAAGCG
	2002	GCGCUUCC	CUGAUGA	X	GAA	AAUCUCUA	UAGAGAUUC	GGAAGCGC
	2021	AGGUUUUG	CUGAUGA	X	GAA	AGCAGGUG	CACCUGCUU	CAAAACCU

	2022	GAGGUUUU	CUGAUGA	X	GAA	AAGCAGGU	ACCUGCUUC	AAAACCUC
	2030	UAGUCACU	CUGAUGA	X	GAA	AGGUUUUG	CAAAACCUC	AGUGACUA
	2038	AGACCUCG	CUGAUGA	X	GAA	AGUCACUG	CAGUGACUA	CGAGGUCU
	2045	CUGAUGGA	CUGAUGA	X	GAA	ACCUCGUA	UACGAGGUC	UCCAUCAG
5	2047	CACUGAUG	CUGAUGA	X	GAA	AGACCUCG	CGAGGUCUC	CAUCAGUG
	2051	GAGCCACU	CUGAUGA	X	GAA	AUGGAGAC	GUCUCCAUC	AGUGGCUC
	2059	AGGUCGUA	CUGAUGA	X	GAA	AGCCACUG	CAGUGGCUC	UACGACCU
	2061	UAAGGUCG	CUGAUGA	X	GAA	AGAGCCAC	GUGGCUCUA	CGACCUUA
	2068	GACAGUCU	CUGAUGA	X	GAA	AGGUCGUA	UACGACCUU	AGACUGUC
10	2069	UGACAGUC	CUGAUGA	X	GAA	AAGGUCGU	ACGACCUUA	GACUGUCA
	2076	UCUAGCUU	CUGAUGA	X	GAA	ACAGUCUA	UAGACUGUC	AAGCUAGA
	2082	GACACCUC	CUGAUGA	X	GAA	AGCUUGAC	GUCAAGCUA	GAGGUGUC
	2090	GGCGCGGG	CUGAUGA	X	GAA	ACACCUCU	AGAGGUGUC	CCCGCGCC
	2100	AGUGAUCU	CUGAUGA	X	GAA	AGGCGCGG	CCGCGCCUC	AGAUCACU
15	2105	AACCAAGU	CUGAUGA	X	GAA	AUCUGAGG	CCUCAGAUC	ACUUGGUU
	2109	UUUGAACC	CUGAUGA	X	GAA	AGUGAUCU	AGAUCACUU	GGUUCAAA
	2113	UGUUUUUG	CUGAUGA	X	GAA	ACCAAGUG	CACUUGGUU	CAAAAACA
	2114	UUGUUUUU	CUGAUGA	X	GAA	AACCAAGU	ACUUGGUUC	AAAAACAA
	2132	UCUUGUUG	CUGAUGA	X	GAA	AUUUUGUG	CACAAAAUA	CAACAAGA
20	2150	CCUAAAAU	CUGAUGA	X	GAA	AUUCCCGG	CCGGGAAUU	AUUUUAGG
	2151	UCCUAAAA	CUGAUGA	X	GAA	AAUUCCCG	CGGGAAUUA	UUUUAGGA
	2153	GGUCCUAA	CUGAUGA	X	GAA	AUAAUUCC	GGAAUUAUU	UUAGGACC
	2154	UGGUCCUA	CUGAUGA	X	GAA	AAUAAUUC	GAAUUAUUU	UAGGACCA
	2155	CUGGUCCU	CUGAUGA	X	GAA	AAAUAAUU	AAUUAUUUU	AGGACCAG
25	2156	CCUGGUCC	CUGAUGA	X	GAA	AAAAUAAU	AUUAUUUUA	GGACCAGG
	2179	UUUCAAUA	CUGAUGA	X	GAA	ACAGCGUG	CACGCUGUU	UAUUGAAA
	2180	CUUUCAAU	CUGAUGA	X	GAA	AACAGCGU	ACGCUGUUU	AUUGAAAG
	2181	UCUUUCAA	CUGAUGA	X	GAA	AAACAGCG	CGCUGUUUA	UUGAAAGA
	2183	ACUCUUUC	CUGAUGA	X	GAA	AUAAACAG	CUGUUUAUU	GAAAGAGU
30	2192	UCCUCUGU	CUGAUGA	X	GAA	ACUCUUUC	GAAAGAGUC	ACAGAGGA
	2213	CACCUAUA	CUGAUGA	X	GAA	ACACCCUC	GAGGGUGUC	UAUAGGUG
	2215	GGCACCUA	CUGAUGA	X	GAA	AGACACCC	GGGUGUCUA	UAGGUGCC
	2217	UCGGCACC	CUGAUGA	X	GAA	AUAGACAC	GUGUCUAUA	GGUGCCGA

2263	CGGUGAGG	CUGAUGA	X	GAA	AGGCUGCG	CGCAGCCUA	CCUCACCG
2267	UGCACGGU	CUGAUGA	X	GAA	AGGUAGGC	GCCUACCUC	ACCGUGCA
2284	ACUUGUCU	CUGAUGA	X	GAA	AGGUUCCU	AGGAACCUC	AGACAAGU
2293	CCAGGUUU	CUGAUGA	X	GAA	ACUUGUCU	AGACAAGUC	AAACCUGG
2309	GUGAGCGU	CUGAUGA	X	GAA	AUCAGCUC	GAGCUGAUC	ACGCUCAC
2315	GUGCACGU	CUGAUGA	X	GAA	AGCGUGAU	AUCACGCUC	ACGUGCAC
2342	AGCCAAAA	CUGAUGA	X	GAA	AGGGUCGC	GCGACCCUC	UUUUGGCU
2344	GGAGCCAA	CUGAUGA	X	GAA	AGAGGGUC	GACCCUCUU	UUGGCUCC
2345	AGGAGCCA	CUGAUGA	X	GAA	AAGAGGGU	ACCCUCUUU	UGGCUCCU
2346	AAGGAGCC	CUGAUGA	X	GAA	AAAGAGGG	CCCUCUUUU	GGCUCCUU
2351	GUUAGAAG	CUGAUGA	X	GAA	AGCCAAAA	UUUUGGCUC	CUUCUAAC
2354	AGAGUUAG	CUGAUGA	X	GAA	AGGAGCCA	UGGCUCCUU	CUAACUCU
2355	GAGAGUUA	CUGAUGA	X	GAA	AAGGAGCC	GGCUCCUUC	UAACUCUC
2357	AAGAGAGU	CUGAUGA	X	GAA	AGAAGGAG	CUCCUUCUA	ACUCUCUU
2361	GAUGAAGA	CUGAUGA	X	GAA	AGUUAGAA	UUCUAACUC	UCUUCAUC
2363	CUGAUGAA	CUGAUGA	X	GAA	AGAGUUAG	CUAACUCUC	UUCAUCAG
2365	UUCUGAUG	CUGAUGA	X	GAA	AGAGAGUU	AACUCUCUU	CAUCAGAA
2366	UUUCUGAU	CUGAUGA	X	GAA	AAGAGAGU	ACUCUCUUC	AUCAGAAA
2369	AGUUUUCU	CUGAUGA	X	GAA	AUGAAGAG	CUCUUCAUC	AGAAAACU
2386	CGGAAGAA	CUGAUGA	X	GAA	ACCGCUUC	GAAGCGGUC	UUCUUCCG
2388	UUCGGAAG	CUGAUGA	X	GAA	AGACCGCU	AGCGGUCUU	CUUCCGAA
2389	CUUCGGAA	CUGAUGA	X	GAA	AAGACCGC	GCGGUCUUC	UUCCGAAG
2391	UACUUCGG	CUGAUGA	X	GAA	AGAAGACC	GGUCUUCUU	CCGAAGUA
2392	UUACUUCG	CUGAUGA	X	GAA	AAGAAGAC	GUCUUCUUC	CGAAGUAA
2399	UCUGUCUU	CUGAUGA	X	GAA	ACUUCGGA	UCCGAAGUA	AAGACAGA
2410	UUGACAGG	CUGAUGA	X	GAA	AGUCUGUC	GACAGACUA	CCUGUCAA
2416	UAAUGAUU	CUGAUGA	X	GAA	ACAGGUAG	CUACCUGUC	AAUCAUUA
2420	UCCAUAAU	CUGAUGA	X	GAA	AUUGACAG	CUGUCAAUC	AUUAUGGA
2423	GGGUCCAU	CUGAUGA	X	GAA	AUGAUUGA	UCAAUCAUU	AUGGACCC
2424	UGGGUCCA	CUGAUGA	X	GAA	AAUGAUUG	CAAUCAUUA	UGGACCCA
2441	UCCAGGGG	CUGAUGA	X	GAA	ACUUCAUC	GAUGAAGUU	CCCCUGGA
2442	AUCCAGGG	CUGAUGA	X	GAA	AACUUCAU	AUGAAGUUC	CCCUGGAU
2473	UGGCAUCA	CUGAUGA	X	GAA	AGGGCAGC	GCUGCCCUA	UGAUGCCA

2494	CCCGUGCA CUGAUGA X GAA	ACUCCCAC	GUGGGAGUU UGCACGGG
2495	UCCCGUGC CUGAUGA X GAA	AACUCCCA	UGGGAGUUU GCACGGGA
2516	GAUUUGCC CUGAUGA X GAA	AGUUUCAG	CUGAAACUA GGCAAAUC
2524	UUCCGAGC CUGAUGA X GAA	AUUUGCCU	AGGCAAAUC GCUCGGAA
2528	CCUCUUCC CUGAUGA X GAA	AGCGAUUU	AAAUCGCUC GGAAGAGG
2541	UUUCCCAA CUGAUGA X GAA	AGCCCCUC	GAGGGGCUU UUGGGAAA
2542	CUUUCCCA CUGAUGA X GAA	AAGCCCCU	AGGGGCUUU UGGGAAAG
2543	ACUUUCCC CUGAUGA X GAA	AAAGCCCC	GGGGCUUUU GGGAAAGU
2552	GCUUGAAC CUGAUGA X GAA	ACUUUCCC	GGGAAAGUC GUUCAAGC
2555	GAGGCUUG CUGAUGA X GAA	ACGACUUU	AAAGUCGUU CAAGCCUC
2556	AGAGGCUU CUGAUGA X GAA	AACGACUU	AAGUCGUUC AAGCCUCU
2563	CAAAUGCA CUGAUGA X GAA	AGGCUUGA	UCAAGCCUC UGCAUUUG
2569	UAAUGCCA CUGAUGA X GAA	AUGCAGAG	CUCUGCAUU UGGCAUUA
2570	UUAAUGCC CUGAUGA X GAA	AAUGCAGA	UCUGCAUUU GGCAUUAA
2576	GAUUUCUU CUGAUGA X GAA	AUGCCAAA	UUUGGCAUU AAGAAAUC
2577	UGAUUUCU CUGAUGA X GAA	AAUGCCAA	UUGGCAUUA AGAAAUCA
2584	AGGUGGGU CUGAUGA X GAA	AUUUCUUA	UAAGAAAUC ACCCACCU
2617	CCUCUUUC CUGAUGA X GAA	ACAUCUUC	GAAGAUGUU GAAAGAGG
2644	GAGCUUUG CUGAUGA X GAA	ACUCACUG	CAGUGAGUA CAAAGCUC
2652	GGUCAUCA CUGAUGA X GAA	AGCUUUGU	ACAAAGCUC UGAUGACC
2666	AAGAUCUU CUGAUGA X GAA	AGUUCGGU	ACCGAACUC AAGAUCUU
2672	UGGGUCAA CUGAUGA X GAA	AUCUUGAG	CUCAAGAUC UUGACCCA
2674	UGUGGGUC CUGAUGA X GAA	AGAUCUUG	CAAGAUCUU GACCCACA
2684	UGAUGGCC CUGAUGA X GAA	AUGUGGGU	ACCCACAUC GGCCAUCA
2691	AUUCAGAU CUGAUGA X GAA	AUGGCCGA	UCGGCCAUC AUCUGAAU
2694	CACAUUCA CUGAUGA X GAA	AUGAUGGC	GCCAUCAUC UGAAUGUG
2705	AGGAGGUU CUGAUGA X GAA	ACCACAUU	AAUGUGGUU AACCUCCU
2706	CAGGAGGU CUGAUGA X GAA	AACCACAU	AUGUGGUUA ACCUCCUG
2711	GCUCCCAG CUGAUGA X GAA	AGGUUAAC	GUUAACCUC CUGGGAGC
2742	CACCAUCA CUGAUGA X GAA	AGGCCCUC	GAGGGCCUC UGAUGGUG
2753	UAUUCCAC CUGAUGA X GAA	AUCACCAU	AUGGUGAUC GUGGAAUA
2761	AUUUGCAG CUGAUGA X GAA	AUUCCACG	CGUGGAAUA CUGCAAAU
2770	GGUUUCCG CUGAUGA X GAA	AUUUGCAG	CUGCAAAUA CGGAAACC

	2782	GGUAGUUG	CUGAUGA	X	GAA	ACAGGUUU	AAACCUGUC	CAACUACC
	2788	UCUUGAGG	CUGAUGA	X	GAA	AGUUGGAC	GUCCAACUA	CCUCAAGA
	2792	UUGCUCUU	CUGAUGA	X	GAA	AGGUAGUU	AACUACCUC	AAGAGCAA
	2809	GACAGAAU	CUGAUGA	X	GAA	AGUCACGU	ACGUGACUU	AUUCUGUC
5	2810	AGACAGAA	CUGAUGA	X	GAA	AAGUCACG	CGUGACUUA	UUCUGUCU
	2812	UGAGACAG	CUGAUGA	X	GAA	AUAAGUCA	UGACUUAUU	CUGUCUCA
	2813	UUGAGACA	CUGAUGA	X	GAA	AAUAAGUC	GACUUAUUC	UGUCUCAA
	2817	CUUGUUGA	CUGAUGA	X	GAA	ACAGAAUA	UAUUCUGUC	UCAACAAG
	2819	UCCUUGUU	CUGAUGA	X	GAA	AGACAGAA	UUCUGUCUC	AACAAGGA
10	2836	CCAUAUGC	CUGAUGA	X	GAA	AGGCUGCG	CGCAGCCUU	GCAUAUGG
	2841	GAGCUCCA	CUGAUGA	X	GAA	AUGCAAGG	CCUUGCAUA	UGGAGCUC
	2849	UCUUUCUU	CUGAUGA	X	GAA	AGCUCCAU	AUGGAGCUC	AAGAAAGA
	2900	ACACUGUC	CUGAUGA	X	GAA	AGGCGGGG	CCCCGCCUA	GACAGUGU
	2909	GAGCUGCU	CUGAUGA	X	GAA	ACACUGUC	GACAGUGUC	AGCAGCUC
15	2917	UGACACUU	CUGAUGA	X	GAA	AGCUGCUG	CAGCAGCUC	AAGUGUCA
	2924	GAGCUGGU	CUGAUGA	X	GAA	ACACUUGA	UCAAGUGUC	ACCAGCUC
	2932	GGAAGCUG	CUGAUGA	X	GAA	AGCUGGUG	CACCAGCUC	CAGCUUCC
	2938	CUUCAGGG	CUGAUGA	X	GAA	AGCUGGAG	CUCCAGCUU	CCCUGAAG
	2939	UCUUCAGG	CUGAUGA	X	GAA	AAGCUGGA	UCCAGCUUC	CCUGAAGA
20	2982	CUCACUGU	CUGAUGA	X	GAA	AUCCUCGU	ACGAGGAUU	ACAGUGAG
	2983	UCUCACUG	CUGAUGA	X	GAA	AAUCCUCG	CGAGGAUUA	CAGUGAGA
	2993	UGCUUGGA	CUGAUGA	X	GAA	AUCUCACU	AGUGAGAUC	UCCAAGCA
	2995	GCUGCUUG	CUGAUGA	X	GAA	AGAUCUCA	UGAGAUCUC	CAAGCAGC
	3008	UCCAUGGU	CUGAUGA	X	GAA	AGGGGCUG	CAGCCCCUC	ACCAUGGA
25	3026	CUGUAGGA	CUGAUGA	X	GAA	AUCAGGUC	GACCUGAUU	UCCUACAG
	3027	ACUGUAGG	CUGAUGA	X	GAA	AAUCAGGU	ACCUGAUUU	CCUACAGU
	3028	AACUGUAG	CUGAUGA	X	GAA	AAAUCAGG	CCUGAUUUC	CUACAGUU
	3031	GGAAACUG	CUGAUGA	X	GAA	AGGAAAUC	GAUUUCCUA	CAGUUUCC
	3036	CACUUGGA	CUGAUGA	X	GAA	ACUGUAGG	CCUACAGUU	UCCAAGUG
30	3037	CCACUUGG	CUGAUGA	X	GAA	AACUGUAG	CUACAGUUU	CCAAGUGG
	3038	GCCACUUG	CUGAUGA	X	GAA	AAACUGUA	UACAGUUUC	CAAGUGGC
	3061	AGGACAGA	CUGAUGA	X	GAA	ACUCCAUG	CAUGGAGUU	UCUGUCCU
	3062	GAGGACAG	CUGAUGA	X	GAA	AACUCCAU	AUGGAGUUU	CUGUCCUC

3063	GGAGGACA CUGAUGA X GAA	AAACUCCA	UGGAGUUUC UGUCCUCC
3067	UUCUGGAG CUGAUGA X GAA	ACAGAAAC	GUUUCUGUC CUCCAGAA
3070	ACUUUCUG CUGAUGA X GAA	AGGACAGA	UCUGUCCUC CAGAAAGU
3083	UCCCGAUG CUGAUGA X GAA	AUGCACUU	AAGUGCAUU CAUCGGGA
3084	GUCCCGAU CUGAUGA X GAA	AAUGCACU	AGUGCAUUC AUCGGGAC
3087	CAGGUCCC CUGAUGA X GAA	AUGAAUGC	GCAUUCAUC GGGACCUG
3110	GAUAAAAG CUGAUGA X GAA	AUGUUUCU	AGAAACAUC CUUUUAUC
3113	UCAGAUAA CUGAUGA X GAA	AGGAUGUU	AACAUCCUU UUAUCUGA
3114	CUCAGAUA CUGAUGA X GAA	AAGGAUGU	ACAUCCUUU UAUCUGAG
3115	UCUCAGAU CUGAUGA X GAA	AAAGGAUG	CAUCCUUUU AUCUGAGA
3116	UUCUCAGA CUGAUGA X GAA	AAAAGGAU	AUCCUUUUA UCUGAGAA
3118	UGUUCUCA CUGAUGA X GAA	AUAAAAGG	CCUUUUAUC UGAGAACA
3140	AAGUCGCA CUGAUGA X GAA	AUCUUCAC	GUGAAGAUU UGCGACUU
3141	AAAGUCGC CUGAUGA X GAA	AAUCUUCA	UGAAGAUUU GCGACUUU
3148	CCAGGCCA CUGAUGA X GAA	AGUCGCAA	UUGCGACUU UGGCCUGG
3149	GCCAGGCC CUGAUGA X GAA	AAGUCGCA	UGCGACUUU GGCCUGGC
3165	CUUAUAAA CUGAUGA X GAA	AUCCCGGG	CCCGGGAUA UUUAUAAG
3167	UUCUUAUA CUGAUGA X GAA	AUAUCCCG	CGGGAUAUU UAUAAGAA
3168	GUUCUUAU CUGAUGA X GAA	AAUAUCCC	GGGAUAUUU AUAAGAAC
3169	GGUUCUUA CUGAUGA X GAA	AAAUAUCC	GGAUAUUUA UAAGAACC
3171	AGGGUUCU CUGAUGA X GAA	AUAAAUAU	AUAUUUAUA AGAACCCU
3183	CCUCACAU CUGAUGA X GAA	AUCAGGGU	ACCCUGAUU AUGUGAGG
3184	UCCUCACA CUGAUGA X GAA	AAUCAGGG	CCCUGAUUA UGUGAGGA
3201	AAGUCGAG CUGAUGA X GAA	AUCUCCUC	GAGGAGAUA CUCGACUU
3204	GGGAAGUC CUGAUGA X GAA	AGUAUCUC	GAGAUACUC GACUUCCC
3209	UUUAGGGG CUGAUGA X GAA	AGUCGAGU	ACUCGACUU CCCCUAAA
3210	UUUUAGGG CUGAUGA X GAA	AAGUCGAG	CUCGACUUC CCCUAAAA
3215	AUCCAUUU CUGAUGA X GAA	AGGGGAAG	CUUCCCCUA AAAUGGAU
3228	GGAUUCAG CUGAUGA X GAA	AGCCAUCC	GGAUGGCUC CUGAAUCC
3235	CAAAGAUG CUGAUGA X GAA	AUUCAGGA	UCCUGAAUC CAUCUUUG
3239	UUGUCAAA CUGAUGA X GAA	AUGGAUUC	GAAUCCAUC UUUGACAA
3241	CCUUGUCA CUGAUGA X GAA	AGAUGGAU	AUCCAUCUU UGACAAGG
3242	ACCUUGUC CUGAUGA X GAA	AAGAUGGA	UCCAUCUUU GACAAGGU

3251	GUGCUGUA CUGAUGA X GAA	ACCUUGUC	GACAAGGUC UACAGCAC
3253	UGGUGCUG CUGAUGA X GAA	AGACCUUG	CAAGGUCUA CAGCACCA
3277	CGCCAUAG CUGAUGA X GAA	ACCACACA	UGUGUGGUC CUAUGGCG
3280	ACACGCCA CUGAUGA X GAA	AGGACCAC	GUGGUCCUA UGGCGUGU
3289	CCCACAGC CUGAUGA X GAA	ACACGCCA	UGGCGUGUU GCUGUGGG
3302	AAGGAGAA CUGAUGA X GAA	AUCUCCCA	UGGGAGAUC UUCUCCUU
3304	CUAAGGAG CUGAUGA X GAA	AGAUCUCC	GGAGAUCUU CUCCUUAG
3305	CCUAAGGA CUGAUGA X GAA	AAGAUCUC	GAGAUCUUC UCCUUAGG
3307	CCCCUAAG CUGAUGA X GAA	AGAAGAUC	GAUCUUCUC CUUAGGGG
3310	AACCCCCU CUGAUGA X GAA	AGGAGAAG	CUUCUCCUU AGGGGGUU
3311	GAACCCCC CUGAUGA X GAA	AAGGAGAA	UUCUCCUUA GGGGGUUC
3318	GUAUGGAG CUGAUGA X GAA	ACCCCCUA	UAGGGGGUU CUCCAUAC
3319	GGUAUGGA CUGAUGA X GAA	AACCCCCU	AGGGGGUUC UCCAUACC
3321	UGGGUAUG CUGAUGA X GAA	AGAACCCC	GGGGUUCUC CAUACCCA
3325	CUCCUGGG CUGAUGA X GAA	AUGGAGAA	UUCUCCAUA CCCAGGAG
3352	GGCUGCAG CUGAUGA X GAA	AGUCUUCA	UGAAGACUU CUGCAGCC
3353	CGGCUGCA CUGAUGA X GAA	AAGUCUUC	GAAGACUUC UGCAGCCG
3397	GUGUGGCA CUGAUGA X GAA	ACUCCGGG	CCCGGAGUA UGCCACAC
3413	AUUUGGUA CUGAUGA X GAA	AUUUCAGG	CCUGAAAUC UACCAAAU
3415	UGAUUUGG CUGAUGA X GAA	AGAUUUCA	UGAAAUCUA CCAAAUCA
3422	UCCAACAU CUGAUGA X GAA	AUUUGGUA	UACCAAAUC AUGUUGGA
3427	AGCAAUCC CUGAUGA X GAA	ACAUGAUU	AAUCAUGUU GGAUUGCU
3432	GUGCCAGC CUGAUGA X GAA	AUCCAACA	UGUUGGAUU GCUGGCAC
3466	GUUCAGCA CUGAUGA X GAA	ACCGGGGC	GCCCCGGUU UGCUGAAC
3467	AGUUCAGC CUGAUGA X GAA	AACCGGGG	CCCCGGUUU GCUGAACU
3476	UUCUCCAC CUGAUGA X GAA	AGUUCAGC	GCUGAACUU GUGGAGAA
3488	AGGUCACC CUGAUGA X GAA	AGUUUCUC	GAGAAACUU GGUGACCU
3500	UUGGCUUG CUGAUGA X GAA	AGCAGGUC	GACCUGCUU CAAGCCAA
3501	GUUGGCUU CUGAUGA X GAA	AAGCAGGU	ACCUGCUUC AAGCCAAC
3512	UCCUGUUG CUGAUGA X GAA	ACGUUGGC	GCCAACGUC CAACAGGA
3531	GGGGAUGU CUGAUGA X GAA	AUCUUUCC	GGAAAGAUU ACAUCCCC
3532	GGGGGAUG CUGAUGA X GAA	AAUCUUUC	GAAAGAUUA CAUCCCCC
3536	UUGAGGGG CUGAUGA X GAA	AUGUAAUC	GAUUACAUC CCCCUCAA

3542	AUGGCAUU CUGAUGA X GAA AGGGGGAU	AUCCCCCUC AAUGCCAU
3551	CUAGUCAG CUGAUGA X GAA AUGGCAUU	AAUGCCAUA CUGACUAG
3558	ACUGUUUC CUGAUGA X GAA AGUCAGUA	UACUGACUA GAAACAGU
3567	UGUGAAGC CUGAUGA X GAA ACUGUUUC	GAAACAGUA GCUUCACA
3571	AGUAUGUG CUGAUGA X GAA AGCUACUG	CAGUAGCUU CACAUACU
3572	GAGUAUGU CUGAUGA X GAA AAGCUACU	AGUAGCUUC ACAUACUC
3577	GGGUCGAG CUGAUGA X GAA AUGUGAAG	CUUCACAUA CUCGACCC
3580	UGGGGGUC CUGAUGA X GAA AGUAUGUG	CACAUACUC GACCCCCA
3592	CCUCAGAG CUGAUGA X GAA AGGUGGGG	CCCCACCUU CUCUGAGG
3593	UCCUCAGA CUGAUGA X GAA AAGGUGGG	CCCACCUUC UCUGAGGA
3595	GGUCCUCA CUGAUGA X GAA AGAAGGUG	CACCUUCUC UGAGGACC
3605	UCCUUGAA CUGAUGA X GAA AGGUCCUC	GAGGACCUU UUCAAGGA
3606	GUCCUUGA CUGAUGA X GAA AAGGUCCU	AGGACCUUU UCAAGGAC
3607	CGUCCUUG CUGAUGA X GAA AAAGGUCC	GGACCUUUU CAAGGACG
3608	CCGUCCUU CUGAUGA X GAA AAAAGGUC	GACCUUUUC AAGGACGG
3619	GAUCUGCA CUGAUGA X GAA AGCCGUCC	GGACGGCUU UGCAGAUC
3620	GGAUCUGC CUGAUGA X GAA AAGCCGUC	GACGGCUUU GCAGAUCC
3627	AAAAUGUG CUGAUGA X GAA AUCUGCAA	UUGCAGAUC CACAUUUU
3633	GGAAUGAA CUGAUGA X GAA AUGUGGAU	AUCCACAUU UUCAUUCC
3634	CGGAAUGA CUGAUGA X GAA AAUGUGGA	UCCACAUUU UCAUUCCG
3635	CCGGAAUG CUGAUGA X GAA AAAUGUGG	CCACAUUUU CAUUCCGG
3636	UCCGGAAU CUGAUGA X GAA AAAAUGUG	CACAUUUUC AUUCCGGA
3639	GCUUCCGG CUGAUGA X GAA AUGAAAAU	AUUUUCAUU CCGGAAGC
3640	AGCUUCCG CUGAUGA X GAA AAUGAAAA	UUUUCAUUC CGGAAGCU
3649	CAUCAUCA CUGAUGA X GAA AGCUUCCG	CGGAAGCUC UGAUGAUG
3664	CGUUUACA CUGAUGA X GAA AUCUCACA	UGUGAGAUA UGUAAACG
3668	AAAGCGUU CUGAUGA X GAA ACAUAUCU	AGAUAUGUA AACGCUUU
3675	GAAUUUGA CUGAUGA X GAA AGCGUUUA	UAAACGCUU UCAAAUUC
3676	UGAAUUUG CUGAUGA X GAA AAGCGUUU	AAACGCUUU CAAAUUCA
3677	AUGAAUUU CUGAUGA X GAA AAAGCGUU	AACGCUUUC AAAUUCAU
3682	GGCUCAUG CUGAUGA X GAA AUUUGAAA	UUUCAAAUU CAUGAGCC
3683	AGGCUCAU CUGAUGA X GAA AAUUUGAA	UUCAAAUUC AUGAGCCU
3701	AAGGUUUU CUGAUGA X GAA AUUCUUUC	GAAAGAAUC AAAACCUU

	3709	GCUCCUCA	CUGAUGA	X	GAA	AGGUUUUG	CAAAACCUU	UGAGGAGC
	3710	AGCUCCUC	CUGAUGA	X	GAA	AAGGUUUU	AAAACCUUU	GAGGAGCU
	3719	UUCGGUGA	CUGAUGA	X	GAA	AGCUCCUC	GAGGAGCUU	UCACCGAA
	3720	GUUCGGUG	CUGAUGA	X	GAA	AAGCUCCU	AGGAGCUUU	CACCGAAC
5	3721	AGUUCGGU	CUGAUGA	X	GAA	AAAGCUCC	GGAGCUUUC	ACCGAACU
	3730	UGGAGGUG	CUGAUGA	X	GAA	AGUUCGGU	ACCGAACUC	CACCUCCA
	3736	CAAACAUG	CUGAUGA	X	GAA	AGGUGGAG	CUCCACCUC	CAUGUUUG
	3742	AGUCCUCA	CUGAUGA	X	GAA	ACAUGGAG	CUCCAUGUU	UGAGGACU
	3743	UAGUCCUC	CUGAUGA	X	GAA	AACAUGGA	UCCAUGUUU	GAGGACUA
10	3751	CCAGCUGA	CUGAUGA	X	GAA	AGUCCUCA	UGAGGACUA	UCAGCUGG
	3753	GUCCAGCU	CUGAUGA	X	GAA	AUAGUCCU	AGGACUAUC	AGCUGGAC
	3765	CAGAGUGC	CUGAUGA	X	GAA	AGUGUCCA	UGGACACUA	GCACUCUG
	3771	GCCCAGCA	CUGAUGA	X	GAA	AGUGCUAG	CUAGCACUC	UGCUGGGC
	3781	GCAAGGGG	CUGAUGA	X	GAA	AGCCCAGC	GCUGGGCUC	CCCCUUGC
15	3787	GCUUCAGC	CUGAUGA	X	GAA	AGGGGGAG	CUCCCCCUU	GCUGAAGC
	3799	UCCAGGUG	CUGAUGA	X	GAA	ACCGCUUC	GAAGCGGUU	CACCUGGA
	3800	GUCCAGGU	CUGAUGA	X	GAA	AACCGCUU	AAGCGGUUC	ACCUGGAC
	3829	UCUUCAUG	CUGAUGA	X	GAA	AGGCCUUG	CAAGGCCUC	CAUGAAGA
	3839	CUCAAGUC	CUGAUGA	X	GAA	AUCUUCAU	AUGAAGAUA	GACUUGAG
20	3844	CUAUUCUC	CUGAUGA	X	GAA	AGUCUAUC	GAUAGACUU	GAGAAUAG
	3851	UUACUCGC	CUGAUGA	X	GAA	AUUCUCAA	UUGAGAAUA	GCGAGUAA
	3858	CUUGCUUU	CUGAUGA	X	GAA	ACUCGCUA	UAGCGAGUA	AAAGCAAG
	3878	AGAUCGGA	CUGAUGA	X	GAA	AGUCCCGC	GCGGGACUU	UCCGAUCU
	3879	CAGAUCGG	CUGAUGA	X	GAA	AAGUCCCG	CGGGACUUU	CCGAUCUG
25	3880	GCAGAUCG	CUGAUGA	X	GAA	AAAGUCCC	GGGACUUUC	CGAUCUGC
	3885	CCUCGGCA	CUGAUGA	X	GAA	AUCGGAAA	UUUCCGAUC	UGCCGAGG
	3901	AGAAGCAG	CUGAUGA	X	GAA	AGCUGGGC	GCCCAGCUU	CUGCUUCU
	3902	GAGAAGCA	CUGAUGA	X	GAA	AAGCUGGG	CCCAGCUUC	UGCUUCUC
	3907	AGCUGGAG	CUGAUGA	X	GAA	AGCAGAAG	CUUCUGCUU	CUCCAGCU
30	3908	CAGCUGGA	CUGAUGA	X	GAA	AAGCAGAA	UUCUGCUUC	UCCAGCUG
	3910	CACAGCUG	CUGAUGA	X	GAA	AGAAGCAG	CUGCUUCUC	CAGCUGUG
	3926	ACGGGCCU	CUGAUGA	X	GAA	AUGUGGCC	GGCCACAUC	AGGCCCGU
	3949	CCAGCUCA	CUGAUGA	X	GAA	AUUCAUCG	CGAUGAAUC	UGAGCUGG

3967	AACAGCAG CUGAUGA X GAA ACUCCUUU	AAAGGAGUC CUGCUGUU
3975	GGGUGGAG CUGAUGA X GAA ACAGCAGG	CCUGCUGUU CUCCACCC
3976	GGGGUGGA CUGAUGA X GAA AACAGCAG	CUGCUGUUC UCCACCCC
3978	UGGGGGUG CUGAUGA X GAA AGAACAGC	GCUGUUCUC CACCCCCA
3991	CGGAGUUG CUGAUGA X GAA AGUCUGGG	CCCAGACUA CAACUCCG
3997	ACACCACG CUGAUGA X GAA AGUUGUAG	CUACAACUC CGUGGUGU
4006	AGGAGUAC CUGAUGA X GAA ACACCACG	CGUGGUGUU GUACUCCU
4009	GGGAGGAG CUGAUGA X GAA ACAACACC	GGUGUUGUA CUCCUCCC
4012	GCGGGGAG CUGAUGA X GAA AGUACAAC	GUUGUACUC CUCCCCGC
4015	CGGGCGGG CUGAUGA X GAA AGGAGUAC	GUACUCCUC CCCGCCCG
4027	AGAAGCUU CUGAUGA X GAA AGGCGGGC	GCCCGCCUA AAGCUUCU
4033	CUGGUGAG CUGAUGA X GAA AGCUUUAG	CUAAAGCUU CUCACCAG
4034	GCUGGUGA CUGAUGA X GAA AAGCUUUA	UAAAGCUUC UCACCAGC
4036	GGGCUGGU CUGAUGA X GAA AGAAGCUU	AAGCUUCUC ACCAGCCC
4066	AUGUAUAA CUGAUGA X GAA ACUGUCAG	CUGACAGUA UUAUACAU
4068	AGAUGUAU CUGAUGA X GAA AUACUGUC	GACAGUAUU AUACAUCU
4069	UAGAUGUA CUGAUGA X GAA AAUACUGU	ACAGUAUUA UACAUCUA
4071	CAUAGAUG CUGAUGA X GAA AUAAUACU	AGUAUUAUA CAUCUAUG
4075	AACUCAUA CUGAUGA X GAA AUGUAUAA	UUAUACAUC UAUGAGUU
4077	UAAACUCA CUGAUGA X GAA AGAUGUAU	AUACAUCUA UGAGUUUA
4083	UAGGUGUA CUGAUGA X GAA ACUCAUAG	CUAUGAGUU UACACCUA
4084	AUAGGUGU CUGAUGA X GAA AACUCAUA	UAUGAGUUU ACACCUAU
4085	AAUAGGUG CUGAUGA X GAA AAACUCAU	AUGAGUUUA CACCUAUU
4091	GAGCGGAA CUGAUGA X GAA AGGUGUAA	UUACACCUA UUCCGCUC
4093	UGGAGCGG CUGAUGA X GAA AUAGGUGU	ACACCUAUU CCGCUCCA
4094	GUGGAGCG CUGAUGA X GAA AAUAGGUG	CACCUAUUC CGCUCCAC
4099	CUCCUGUG CUGAUGA X GAA AGCGGAAU	AUUCCGCUC CACAGGAG
4117	GUCACGAA CUGAUGA X GAA AGCAGCUG	CAGCUGCUU UUCGUGAC
4118	GGUCACGA CUGAUGA X GAA AAGCAGCU	AGCUGCUUU UCGUGACC
4119	AGGUCACG CUGAUGA X GAA AAAGCAGC	GCUGCUUUU CGUGACCU
4120	AAGGUCAC CUGAUGA X GAA AAAAGCAG	CUGCUUUUC GUGACCUU
4128	CACGAUUA CUGAUGA X GAA AGGUCACG	CGUGACCUU UAAUCGUG
4129	GCACGAUU CUGAUGA X GAA AAGGUCAC	GUGACCUUU AAUCGUGC

4130	AGCACGAU CUGAUGA X GAA AAAGGUCA	UGACCUUUA AUCGUGCU
4133	AAAAGCAC CUGAUGA X GAA AUUAAAGG	CCUUUAAUC GUGCUUUU
4139	AAACAAAA CUGAUGA X GAA AGCACGAU	AUCGUGCUU UUUUGUUU
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4150	AACAAAAC CUGAUGA X GAA AAAAACAA	UUGUUUUUU GUUUUGUU
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4154	AACAAACA CUGAUGA X GAA AACAAAAA	UUUUUGUUU UGUUUGUU
4155	CAACAAAC CUGAUGA X GAA AAACAAAA	UUUUGUUUU GUUUGUUG
4158	CAACAACA CUGAUGA X GAA ACAAAACA	UGUUUUGUU UGUUGUUG
4159	GCAACAAC CUGAUGA X GAA AACAAAAC	GUUUUGUUU GUUGUUGC
4162	ACAGCAAC CUGAUGA X GAA ACAAACAA	UUGUUUGUU GUUGCUGU
4165	AAAACAGC CUGAUGA X GAA ACAACAAA	UUUGUUGUU GCUGUUUU
4171	UUAGUCAA CUGAUGA X GAA ACAGCAAC	GUUGCUGUU UUGACUAA
4172	GUUAGUCA CUGAUGA X GAA AACAGCAA	UUGCUGUUU UGACUAAC
4173	UGUUAGUC CUGAUGA X GAA AAACAGCA	UGCUGUUUU GACUAACA
4178	AUUCUUGU CUGAUGA X GAA AGUCAAAA	UUUUGACUA ACAAGAAU
4189	ACUGGGGU CUGAUGA X GAA ACAUUCUU	AAGAAUGUA ACCCCAGU
4198	ACGUCACU CUGAUGA X GAA ACUGGGGU	ACCCCAGUU AGUGACGU
4199	CACGUCAC CUGAUGA X GAA AACUGGGG	CCCCAGUUA GUGACGUG
4216	AACAAUAG CUGAUGA X GAA AUUCUUCA	UGAAGAAUA CUAUUGUU
4219	UCUAACAA CUGAUGA X GAA AGUAUUCU	AGAAUACUA UUGUUAGA
4221	UCUCUAAC CUGAUGA X GAA AUAGUAUU	AAUACUAUU GUUAGAGA
4224	AUUUCUCU CUGAUGA X GAA ACAAUAGU	ACUAUUGUU AGAGAAAU
4225	GAUUUCUC CUGAUGA X GAA AACAAUAG	CUAUUGUUA GAGAAAUC
4233	GCGGGGGG CUGAUGA X GAA AUUUCUCU	AGAGAAAUC CCCCCCGC
4249	GUUACCCU CUGAUGA X GAA AGGCUUUG	CAAAGCCUC AGGGUAAC

	4255	GUCCAGGU	CUGAUGA	X	GAA	ACCCUGAG	CUCAGGGUA	ACCUGGAC
	4282	GGUCGCCA	CUGAUGA	X	GAA	AGGCACCU	AGGUGCCUC	UGGCGACC
	4323	GCUGCAGG	CUGAUGA	X	GAA	AGGGUGGG	CCCACCCUC	CCUGCAGC
	4341	ACUGCCUC	CUGAUGA	X	GAA	AGUCCCAC	GUGGGACUA	GAGGCAGU
5	4350	AAUGGGCU	CUGAUGA	X	GAA	ACUGCCUC	GAGGCAGUA	AGCCCAUU
	4358	CAUGAGCU	CUGAUGA	X	GAA	AUGGGCUU	AAGCCCAUU	AGCUCAUG
	4359	CCAUGAGC	CUGAUGA	X	GAA	AAUGGGCU	AGCCCAUUA	GCUCAUGG
	4363	GCAGCCAU	CUGAUGA	X	GAA	AGCUAAUG	CAUUAGCUC	AUGGCUGC
	4387	GAGAGACA	CUGAUGA	X	GAA	AGCAGGUC	GACCUGCUC	UGUCUCUC
10	4391	AUAAGAGA	CUGAUGA	X	GAA	ACAGAGCA	UGCUCUGUC	UCUCUUAU
	4393	CCAUAAGA	CUGAUGA	X	GAA	AGACAGAG	CUCUGUCUC	UCUUAUGG
	4395	CUCCAUAA	CUGAUGA	X	GAA	AGAGACAG	CUGUCUCUC	UUAUGGAG
	4397	UCCUCCAU	CUGAUGA	X	GAA	AGAGAGAC	GUCUCUCUU	AUGGAGGA
	4398	UUCCUCCA	CUGAUGA	X	GAA	AAGAGAGA	UCUCUCUUA	UGGAGGAA
15	4445	GCAUCCCA	CUGAUGA	X	GAA	AGCCUUUU	AAAAGGCUU	UGGGAUGC
	4446	CGCAUCCC	CUGAUGA	X	GAA	AAGCCUUU	AAAGGCUUU	GGGAUGCG
	4456	ACAGGACG	CUGAUGA	X	GAA	ACGCAUCC	GGAUGCGUC	CGUCCUGU
	4460	CUCCACAG	CUGAUGA	X	GAA	ACGGACGC	GCGUCCGUC	CUGUGGAG
	4487	GCAUAGCG	CUGAUGA	X	GAA	AGCCCCCU	AGGGGGCUC	CGCUAUGC
20	4492	AAGUGGCA	CUGAUGA	X	GAA	AGCGGAGC	GCUCCGCUA	UGCCACUU
	4500	AGUCACUG	CUGAUGA	X	GAA	AGUGGCAU	AUGCCACUU	CAGUGACU
	4501	AAGUCACU	CUGAUGA	X	GAA	AAGUGGCA	UGCCACUUC	AGUGACUU
	4509	GGAGUGAG	CUGAUGA	X	GAA	AGUCACUG	CAGUGACUU	CUCACUCC
	4510	AGGAGUGA	CUGAUGA	X	GAA	AAGUCACU	AGUGACUUC	UCACUCCU
25	4512	CCAGGAGU	CUGAUGA	X	GAA	AGAAGUCA	UGACUUCUC	ACUCCUGG
	4516	GAGGCCAG	CUGAUGA	X	GAA	AGUGAGAA	UUCUCACUC	CUGGCCUC
	4524	AAACAGCG	CUGAUGA	X	GAA	AGGCCAGG	CCUGGCCUC	CGCUGUUU
	4531	GGGCCCGA	CUGAUGA	X	GAA	ACAGCGGA	UCCGCUGUU	UCGGGCCC
	4532	GGGGCCCG	CUGAUGA	X	GAA	AACAGCGG	CCGCUGUUU	CGGGCCCC
30	4533	GGGGGCCC	CUGAUGA	X	GAA	AAACAGCG	CGCUGUUUC	GGGCCCCC
	4543	CCUCUUGG	CUGAUGA	X	GAA	AGGGGGCC	GGCCCCCUU	CCAAGAGG
	4544	ACCUCUUG	CUGAUGA	X	GAA	AAGGGGGC	GCCCCCUUC	CAAGAGGU
	4553	UGCUCUGA	CUGAUGA	X	GAA	ACCUCUUG	CAAGAGGUA	UCAGAGCA

4555	UCUGCUCU CUGAUGA X GAA AUACCUCU	AGAGGUAUC AGAGCAGA
4577	GUCUAGGA CUGAUGA X GAA ACGUCCCU	AGGGACGUU UCCUAGAC
4578	GGUCUAGG CUGAUGA X GAA AACGUCCC	GGGACGUUU CCUAGACC
4579	UGGUCUAG CUGAUGA X GAA AAACGUCC	GGACGUUUC CUAGACCA
4582	CCCUGGUC CUGAUGA X GAA AGGAAACG	CGUUUCCUA GACCAGGG
4598	UUCCCGAG CUGAUGA X GAA ACAUGUGC	GCACAUGUU CUCGGGAA
4599	GUUCCCGA CUGAUGA X GAA AACAUGUG	CACAUGUUC UCGGGAAC
4601	UGGUUCCC CUGAUGA X GAA AGAACAUG	CAUGUUCUC GGGAACCA
4614	UUAAGAUU CUGAUGA X GAA ACUGUGGU	ACCACAGUU AAUCUUAA
4615	UUUAAGAU CUGAUGA X GAA AACUGUGG	CCACAGUUA AUCUUAAA
4618	AGAUUUAA CUGAUGA X GAA AUUAACUG	CAGUUAAUC UUAAAUCU
4620	AAAGAUUU CUGAUGA X GAA AGAUUAAC	GUUAAUCUU AAAUCUUU
4621	AAAAGAUU CUGAUGA X GAA AAGAUUAA	UUAAUCUUA AAUCUUUU
4625	CGGGAAAA CUGAUGA X GAA AUUUAAGA	UCUUAAAUC UUUUCCCG
4627	CCCGGGAA CUGAUGA X GAA AGAUUUAA	UUAAAUCUU UUCCCGGG
4628	UCCCGGGA CUGAUGA X GAA AAGAUUUA	UAAAUCUUU UCCCGGGA
4629	CUCCCGGG CUGAUGA X GAA AAAGAUUU	AAAUCUUUU CCCGGGAG
4630	ACUCCCGG CUGAUGA X GAA AAAAGAUU	AAUCUUUUC CCGGGAGU
4639	CAACAGAA CUGAUGA X GAA ACUCCCGG	CCGGGAGUC UUCUGUUG
4641	GACAACAG CUGAUGA X GAA AGACUCCC	GGGAGUCUU CUGUUGUC
4642	AGACAACA CUGAUGA X GAA AAGACUCC	GGAGUCUUC UGUUGUCU
4646	AAACAGAC CUGAUGA X GAA ACAGAAGA	UCUUCUGUU GUCUGUUU
4649	GGUAAACA CUGAUGA X GAA ACAACAGA	UCUGUUGUC UGUUUACC
4653	GGAUGGUA CUGAUGA X GAA ACAGACAA	UUGUCUGUU UACCAUCC
4654	UGGAUGGU CUGAUGA X GAA AACAGACA	UGUCUGUUU ACCAUCCA
4655	UUGGAUGG CUGAUGA X GAA AAACAGAC	GUCUGUUUA CCAUCCAA
4660	AUGCUUUG CUGAUGA X GAA AUGGUAAA	UUUACCAUC CAAAGCAU
4669	AUGUUAAA CUGAUGA X GAA AUGCUUUG	CAAAGCAUA UUUAACAU
4671	ACAUGUUA CUGAUGA X GAA AUAUGCUU	AAGCAUAUU UAACAUGU
4672	CACAUGUU CUGAUGA X GAA AAUAUGCU	AGCAUAUUU AACAUGUG
4673	ACACAUGU CUGAUGA X GAA AAAUAUGC	GCAUAUUUA ACAUGUGU
4682	CCCCCACU CUGAUGA X GAA ACACAUGU	ACAUGUGUC AGUGGGGG
4698	CAGAAGCC CUGAUGA X GAA AGCGCCAC	GUGGCGCUU GGCUUCUG

	4703	GGCCUCAG	CUGAUGA	X	GAA	AGCCAAGC	GCUUGGCUU	CUGAGGCC
	4704	UGGCCUCA	CUGAUGA	X	GAA	AAGCCAAG	CUUGGCUUC	UGAGGCCA
	4720	GAACUGAU	CUGAUGA	X	GAA	AUGGCUCU	AGAGCCAUC	AUCAGUUC
	4723	GAGGAACU	CUGAUGA	X	GAA	AUGAUGGC	GCCAUCAUC	AGUUCCUC
5	4727	ACUAGAGG	CUGAUGA	X	GAA	ACUGAUGA	UCAUCAGUU	CCUCUAGU
	4728	CACUAGAG	CUGAUGA	X	GAA	AACUGAUG	CAUCAGUUC	CUCUAGUG
	4731	UCUCACUA	CUGAUGA	X	GAA	AGGAACUG	CAGUUCCUC	UAGUGAGA
	4733	CAUCUCAC	CUGAUGA	X	GAA	AGAGGAAC	GUUCCUCUA	GUGAGAUG
	4745	AUGACCUC	CUGAUGA	X	GAA	AUGCAUCU	AGAUGCAUU	GAGGUCAU
10	4751	UUGGGUAU	CUGAUGA	X	GAA	ACCUCAAU	AUUGAGGUC	AUACCCAA
	4754	AGCUUGGG	CUGAUGA	X	GAA	AUGACCUC	GAGGUCAUA	CCCAAGCU
	4763	AGGCCUGC	CUGAUGA	X	GAA	AGCUUGGG	CCCAAGCUU	GCAGGCCU
	4777	AGUAUGCG	CUGAUGA	X	GAA	AGGUCAGG	CCUGACCUU	CGCAUACU
	4778	CAGUAUGC	CUGAUGA	X	GAA	AAGGUCAG	CUGACCUUC	GCAUACUG
15	4783	GUGAGCAG	CUGAUGA	X	GAA	AUGCGAAG	CUUCGCAUA	CUGCUCAC
	4789	CUCCCCGU	CUGAUGA	X	GAA	AGCAGUAU	AUACUGCUC	ACGGGGAG
	4799	GACCACUU	CUGAUGA	X	GAA	ACUCCCCG	CGGGGAGUU	AAGUGGUC
	4800	GGACCACU	CUGAUGA	X	GAA	AACUCCCC	GGGGAGUUA	AGUGGUCC
	4807	CCAAACUG	CUGAUGA	X	GAA	ACCACUUA	UAAGUGGUC	CAGUUUGG
20	4812	CUAGGCCA	CUGAUGA	X	GAA	ACUGGACC	GGUCCAGUU	UGGCCUAG
	4813	ACUAGGCC	CUGAUGA	X	GAA	AACUGGAC	GUCCAGUUU	GGCCUAGU
	4819	AACCUUAC	CUGAUGA	X	GAA	AGGCCAAA	UUUGGCCUA	GUAAGGUU
	4822	GGCAACCU	CUGAUGA	X	GAA	ACUAGGCC	GGCCUAGUA	AGGUUGCC
	4827	CAGUAGGC	CUGAUGA	X	GAA	ACCUUACU	AGUAAGGUU	GCCUACUG
25	4832	CCCAUCAG	CUGAUGA	X	GAA	AGGCAACC	GGUUGCCUA	CUGAUGGG
	4843	UGGCUUUU	CUGAUGA	X	GAA	AGCCCAUC	GAUGGGCUC	AAAAGCCA
	4855	CUGUUUAA	CUGAUGA	X	GAA	AUGUGGCU	AGCCACAUU	UUAAACAG
	4856	CCUGUUUA	CUGAUGA	X	GAA	AAUGUGGC	GCCACAUUU	UAAACAGG
	4857	ACCUGUUU	CUGAUGA	X	GAA	AAAUGUGG	CCACAUUUU	AAACAGGU
30	4858	AACCUGUU	CUGAUGA	X	GAA	AAAAUGUG	CACAUUUUA	AACAGGUU
	4866	UGAGAUAA	CUGAUGA	X	GAA	ACCUGUUU	AAACAGGUU	UUAUCUCA
	4867	UUGAGAUA	CUGAUGA	X	GAA	AACCUGUU	AACAGGUUU	UAUCUCAA
	4868	CUUGAGAU	CUGAUGA	X	GAA	AAACCUGU	ACAGGUUUU	AUCUCAAG

	4869	ACUUGAGA	CUGAUGA	X	GAA	AAAACCUG	CAGGUUUUA	UCUCAAGU
	4871	AUACUUGA	CUGAUGA	X	GAA	AUAAAACC	GGUUUUAUC	UCAAGUAU
	4873	UAAUACUU	CUGAUGA	X	GAA	AGAUAAAA	UUUUAUCUC	AAGUAUUA
	4878	UAUAUUAA	CUGAUGA	X	GAA	ACUUGAGA	UCUCAAGUA	UUAAUAUA
5	4880	UAUAUAUU	CUGAUGA	X	GAA	AUACUUGA	UCAAGUAUU	AAUAUAUA
	4881	CUAUAUAU	CUGAUGA	X	GAA	AAUACUUG	CAAGUAUUA	AUAUAUAG
	4884	UGUCUAUA	CUGAUGA	X	GAA	AUUAAUAC	GUAUUAAUA	UAUAGACA
	4886	CUUGUCUA	CUGAUGA	X	GAA	AUAUUAAU	AUUAAUAUA	UAGACAAG
	4888	GUCUUGUC	CUGAUGA	X	GAA	AUAUAUUA	UAAUAUAUA	GACAAGAC
10	4900	UAAUGCAU	CUGAUGA	X	GAA	AGUGUCUU	AAGACACUU	AUGCAUUA
	4901	AUAAUGCA	CUGAUGA	X	GAA	AAGUGUCU	AGACACUUA	UGCAUUAU
	4907	AACAGGAU	CUGAUGA	X	GAA	AUGCAUAA	UUAUGCAUU	AUCCUGUU
	4908	AAACAGGA	CUGAUGA	X	GAA	AAUGCAUA	UAUGCAUUA	UCCUGUUU
	4910	UAAAACAG	CUGAUGA	X	GAA	AUAAUGCA	UGCAUUAUC	CUGUUUUA
15	4915	AUAUAUAA	CUGAUGA	X	GAA	ACAGGAUA	UAUCCUGUU	UUAUAUAU
	4916	GAUAUAUA	CUGAUGA	X	GAA	AACAGGAU	AUCCUGUUU	UAUAUAUC
	4917	GGAUAUAU	CUGAUGA	X	GAA	AAACAGGA	UCCUGUUUU	AUAUAUCC
	4918	UGGAUAUA	CUGAUGA	X	GAA	AAAACAGG	CCUGUUUUA	UAUAUCCA
	4920	AUUGGAUA	CUGAUGA	X	GAA	AUAAAACA	UGUUUUAUA	UAUCCAAU
20	4922	UCAUUGGA	CUGAUGA	X	GAA	AUAUAAAA	UUUUAUAUA	UCCAAUGA
	4924	AUUCAUUG	CUGAUGA	X	GAA	AUAUAUAA	UUAUAUAUC	CAAUGAAU
	4933	CCCAGUUA	CUGAUGA	X	GAA	AUUCAUUG	CAAUGAAUA	UAACUGGG
	4935	GCCCCAGU	CUGAUGA	X	GAA	AUAUUCAU	AUGAAUAUA	ACUGGGGC
	4948	UGACUCUU	CUGAUGA	X	GAA	ACUCGCCC	GGGCGAGUU	AAGAGUCA
25	4949	AUGACUCU	CUGAUGA	X	GAA	AACUCGCC	GGCGAGUUA	AGAGUCAU
	4955	UAGACCAU	CUGAUGA	X	GAA	ACUCUUAA	UUAAGAGUC	AUGGUCUA
	4961	CUUUUCUA	CUGAUGA	X	GAA	ACCAUGAC	GUCAUGGUC	UAGAAAAG
	4963	CCCUUUUC	CUGAUGA	X	GAA	AGACCAUG	CAUGGUCUA	GAAAAGGG
	4974	UACAGAGA	CUGAUGA	X	GAA	ACCCCUUU	AAAGGGGUU	UCUCUGUA
30	4975	GUACAGAG	CUGAUGA	X	GAA	AACCCCUU	AAGGGGUUU	CUCUGUAC
	4976	GGUACAGA	CUGAUGA	X	GAA	AAACCCCU	AGGGGUUUC	UCUGUACC
	4978	UGGGUACA	CUGAUGA	X	GAA	AGAAACCC	GGGUUUCUC	UGUACCCA
	4982	GAUUUGGG	CUGAUGA	X	GAA	ACAGAGAA	UUCUCUGUA	CCCAAAUC

4990	ACCAGCCC CUGAUGA X GAA AUUUGGGU	ACCCAAAUC GGGCUGGU
4999	CUUGGUCC CUGAUGA X GAA ACCAGCCC	GGGCUGGUU GGACCAAG
5029	GCUGGGAC CUGAUGA X GAA ACCACUCU	AGAGUGGUU GUCCCAGC
5032	AUAGCUGG CUGAUGA X GAA ACAACCAC	GUGGUUGUC CCAGCUAU
5039	AGUAACUA CUGAUGA X GAA AGCUGGGA	UCCCAGCUA UAGUUACU
5041	UUAGUAAC CUGAUGA X GAA AUAGCUGG	CCAGCUAUA GUUACUAA
5044	AGUUUAGU CUGAUGA X GAA ACUAUAGC	GCUAUAGUU ACUAAACU
5045	UAGUUUAG CUGAUGA X GAA AACUAUAG	CUAUAGUUA CUAAACUA
5048	GAGUAGUU CUGAUGA X GAA AGUAACUA	UAGUUACUA AACUACUC
5053	UGGGUGAG CUGAUGA X GAA AGUUUAGU	ACUAAACUA CUCACCCA
5056	CUUUGGGU CUGAUGA X GAA AGUAGUUU	AAACUACUC ACCCAAAG
5066	GAGGUCCC CUGAUGA X GAA ACUUUGGG	CCCAAAGUU GGGACCUC
5074	AAGCCAGU CUGAUGA X GAA AGGUCCCA	UGGGACCUC ACUGGCUU
5082	GUAAAGAG CUGAUGA X GAA AGCCAGUG	CACUGGCUU CUCUUUAC
5083	AGUAAAGA CUGAUGA X GAA AAGCCAGU	ACUGGCUUC UCUUUACU
5085	GAAGUAAA CUGAUGA X GAA AGAAGCCA	UGGCUUCUC UUUACUUC
5087	AUGAAGUA CUGAUGA X GAA AGAGAAGC	GCUUCUCUU UACUUCAU
5088	GAUGAAGU CUGAUGA X GAA AAGAGAAG	CUUCUCUUU ACUUCAUC
5089	UGAUGAAG CUGAUGA X GAA AAAGAGAA	UUCUCUUUA CUUCAUCA
5092	CCAUGAUG CUGAUGA X GAA AGUAAAGA	UCUUUACUU CAUCAUGG
5093	UCCAUGAU CUGAUGA X GAA AAGUAAAG	CUUUACUUC AUCAUGGA
5096	AAAUCCAU CUGAUGA X GAA AUGAAGUA	UACUUCAUC AUGGAUUU
5103	GAUGGUGA CUGAUGA X GAA AUCCAUGA	UCAUGGAUU UCACCAUC
5104	GGAUGGUG CUGAUGA X GAA AAUCCAUG	CAUGGAUUU CACCAUCC
5105	GGGAUGGU CUGAUGA X GAA AAAUCCAU	AUGGAUUUC ACCAUCCC
5111	UGCCUUGG CUGAUGA X GAA AUGGUGAA	UUCACCAUC CCAAGGCA
5122	UCCUCUCA CUGAUGA X GAA ACUGCCUU	AAGGCAGUC UGAGAGGA
5134	AUACUCUU CUGAUGA X GAA AGCUCCUC	GAGGAGCUA AAGAGUAU
5141	UGGGCUGA CUGAUGA X GAA ACUCUUUA	UAAAGAGUA UCAGCCCA
5143	UAUGGGCU CUGAUGA X GAA AUACUCUU	AAGAGUAUC AGCCCAUA
5151	UUAAUAAA CUGAUGA X GAA AUGGGCUG	CAGCCCAUA UUUAUUAA
5153	GCUUAAUA CUGAUGA X GAA AUAUGGGC	GCCCAUAUU UAUUAAGC
5154	UGCUUAAU CUGAUGA X GAA AAUAUGGG	CCCAUAUUU AUUAAGCA

	5155	GUGCUUAA	CUGAUGA	X	GAA	AAAUAUGG	CCAUAUUUA	UUAAGCAC
	5157	AAGUGCUU	CUGAUGA	X	GAA	AUAAAUAU	AUAUUUAUU	AAGCACUU
	5158	AAAGUGCU	CUGAUGA	X	GAA	AAUAAAUA	UAUUUAUUA	AGCACUUU
	5165	GGAGCAUA	CUGAUGA	X	GAA	AGUGCUUA	UAAGCACUU	UAUGCUCC
5	5166	AGGAGCAU	CUGAUGA	X	GAA	AAGUGCUU	AAGCACUUU	AUGCUCCU
	5167	AAGGAGCA	CUGAUGA	X	GAA	AAAGUGCU	AGCACUUUA	UGCUCCUU
	5172	GUGCCAAG	CUGAUGA	X	GAA	AGCAUAAA	UUUAUGCUC	CUUGGCAC
	5175	GCUGUGCC	CUGAUGA	X	GAA	AGGAGCAU	AUGCUCCUU	GGCACAGC
	5195	GCAUAAAU	CUGAUGA	X	GAA	ACACAUCA	UGAUGUGUA	AUUUAUGC
10	5198	CUUGCAUA	CUGAUGA	X	GAA	AUUACACA	UGUGUAAUU	UAUGCAAG
	5199	GCUUGCAU	CUGAUGA	X	GAA	AAUUACAC	GUGUAAUUU	AUGCAAGC
	5200	AGCUUGCA	CUGAUGA	X	GAA	AAAUUACA	UGUAAUUUA	UGCAAGCU
	5209	UGGAGAGG	CUGAUGA	X	GAA	AGCUUGCA	UGCAAGCUC	CCUCUCCA
	5213	UAGCUGGA	CUGAUGA	X	GAA	AGGGAGCU	AGCUCCCUC	UCCAGCUA
15	5215	CCUAGCUG	CUGAUGA	X	GAA	AGAGGGAG	CUCCCUCUC	CAGCUAGG
	5221	CUGAGUCC	CUGAUGA	X	GAA	AGCUGGAG	CUCCAGCUA	GGACUCAG
	5227	AAUAUCCU	CUGAUGA	X	GAA	AGUCCUAG	CUAGGACUC	AGGAUAUU
	5233	UUGACUAA	CUGAUGA	X	GAA	AUCCUGAG	CUCAGGAUA	UUAGUCAA
	5235	CAUUGACU	CUGAUGA	X	GAA	AUAUCCUG	CAGGAUAUU	AGUCAAUG
20	5236	UCAUUGAC	CUGAUGA	X	GAA	AAUAUCCU	AGGAUAUUA	GUCAAUGA
	5239	GGCUCAUU	CUGAUGA	X	GAA	ACUAAUAU	AUAUUAGUC	AAUGAGCC
	5250	UUCCUUUU	CUGAUGA	X	GAA	AUGGCUCA	UGAGCCAUC	AAAAGGAA
	5273	AAAUAAGA	CUGAUGA	X	GAA	AGGUUUUU	AAAAACCUA	UCUUAUUU
	5275	GAAAAUAA	CUGAUGA	X	GAA	AUAGGUUU	AAACCUAUC	UUAUUUUC
25	5277	AUGAAAAU	CUGAUGA	X	GAA	AGAUAGGU	ACCUAUCUU	AUUUUCAU
	5278	GAUGAAAA	CUGAUGA	X	GAA	AAGAUAGG	CCUAUCUUA	UUUUCAUC
	5280	CAGAUGAA	CUGAUGA	X	GAA	AUAAGAUA	UAUCUUAUU	UUCAUCUG
	5281	ACAGAUGA	CUGAUGA	X	GAA	AAUAAGAU	AUCUUAUUU	UCAUCUGU
	5282	AACAGAUG	CUGAUGA	X	GAA	AAAUAAGA	UCUUAUUUU	CAUCUGUU
30	5283	AAACAGAU	CUGAUGA	X	GAA	AAAAUAAG	CUUAUUUUC	AUCUGUUU
	5286	AUGAAACA	CUGAUGA	X	GAA	AUGAAAAU	AUUUUCAUC	UGUUUCAU
	5290	AGGUAUGA	CUGAUGA	X	GAA	ACAGAUGA	UCAUCUGUU	UCAUACCU
	5291	AAGGUAUG	CUGAUGA	X	GAA	AACAGAUG	CAUCUGUUU	CAUACCUU

5292	CAAGGUAU CUGAUGA X GAA	AAACAGAU	AUCUGUUUC AUACCUUG
5295	AGACAAGG CUGAUGA X GAA	AUGAAACA	UGUUUCAUA CCUUGUCU
5299	CCCCAGAC CUGAUGA X GAA	AGGUAUGA	UCAUACCUU GUCUGGGG
5302	AGACCCCA CUGAUGA X GAA	ACAAGGUA	UACCUUGUC UGGGGUCU
5309	CGUCAUUA CUGAUGA X GAA	ACCCCAGA	UCUGGGGUC UAAUGACG
5311	AUCGUCAU CUGAUGA X GAA	AGACCCCA	UGGGGUCUA AUGACGAU
5331	CCCAUGUC CUGAUGA X GAA	ACCCUGUU	AACAGGGUA GACAUGGG
5350	CCCUUUUC CUGAUGA X GAA	ACCCUGUC	GACAGGGUA GAAAAGGG
5367	ACCCCAAA CUGAUGA X GAA	AGCGGGCA	UGCCCGCUC UUUGGGGU
5369	AGACCCCA CUGAUGA X GAA	AGAGCGGG	CCCGCUCUU UGGGGUCU
5370	UAGACCCC CUGAUGA X GAA	AAGAGCGG	CCGCUCUUU GGGGUCUA
5376	CAUCUCUA CUGAUGA X GAA	ACCCCAAA	UUUGGGGUC UAGAGAUG
5378	CUCAUCUC CUGAUGA X GAA	AGACCCCA	UGGGGUCUA GAGAUGAG
5395	AUUUUAGA CUGAUGA X GAA	ACCCAGGG	CCCUGGGUC UCUAAAAU
5397	CCAUUUUA CUGAUGA X GAA	AGACCCAG	CUGGGUCUC UAAAAUGG
5399	AGCCAUUU CUGAUGA X GAA	AGAGACCC	GGGUCUCUA AAAUGGCU
5408	UUCUAAGA CUGAUGA X GAA	AGCCAUUU	AAAUGGCUC UCUUAGAA
5410	ACUUCUAA CUGAUGA X GAA	AGAGCCAU	AUGGCUCUC UUAGAAGU
5412	CAACUUCU CUGAUGA X GAA	AGAGAGCC	GGCUCUCUU AGAAGUUG
5413	ACAACUUC CUGAUGA X GAA	AAGAGAGC	GCUCUCUUA GAAGUUGU
5419	GCACAUAC CUGAUGA X GAA	ACUUCUAA	UUAGAAGUU GUAUGUGC
5422	UUUGCACA CUGAUGA X GAA	ACAACUUC	GAAGUUGUA UGUGCAAA
5432	CAGACCAU CUGAUGA X GAA	AUUUGCAC	GUGCAAAUU AUGGUCUG
5433	ACAGACCA CUGAUGA X GAA	AAUUUGCA	UGCAAAUUA UGGUCUGU
5438	AGCACACA CUGAUGA X GAA	ACCAUAAU	AUUAUGGUC UGUGUGCU
5447	CACGACCU CUGAUGA X GAA	AGCACACA	UGUGUGCUU AGGUCGUG
5448	GCACGACC CUGAUGA X GAA	AAGCACAC	GUGUGCUUA GGUCGUGC
5452	GUGUGCAC CUGAUGA X GAA	ACCUAAGC	GCUUAGGUC GUGCACAC
5475	CCAGCUGU CUGAUGA X GAA	ACCGGCUC	GAGCCGGUC ACAGCUGG
5497	AAAGCAGC CUGAUGA X GAA	AUUCAUCG	CGAUGAAUA GCUGCUUU
5504	CUCUCCCA CUGAUGA X GAA	AGCAGCUA	UAGCUGCUU UGGGAGAG
5505	GCUCUCCC CUGAUGA X GAA	AAGCAGCU	AGCUGCUUU GGGAGAGC
5524	UAAGUGGC CUGAUGA X GAA	AGCAUGCU	AGCAUGCUA GCCACUUA

	5531	AGAGAAUU	CUGAUGA	X	GAA	AGUGGCUA	UAGCCACUU	AAUUCUCU
	5532	CAGAGAAU	CUGAUGA	X	GAA	AAGUGGCU	AGCCACUUA	AUUCUCUG
	5535	GGUCAGAG	CUGAUGA	X	GAA	AUUAAGUG	CACUUAAUU	CUCUGACC
	5536	CGGUCAGA	CUGAUGA	X	GAA	AAUUAAGU	ACUUAAUUC	UCUGACCG
5	5538	CCCGGUCA	CUGAUGA	X	GAA	AGAAUUAA	UUAAUUCUC	UGACCGGG
	5554	GUACCCAU	CUGAUGA	X	GAA	AUGCUGGC	GCCAGCAUC	AUGGGUAC
	5561	GGAGCAGG	CUGAUGA	X	GAA	ACCCAUGA	UCAUGGGUA	CCUGCUCC
	5568	ACACAGGG	CUGAUGA	X	GAA	AGCAGGUA	UACCUGCUC	CCCUGUGU
	5577	GGAUGGGG	CUGAUGA	X	GAA	ACACAGGG	CCCUGUGUA	CCCCAUCC
10	5584	ACCUUAAG	CUGAUGA	X	GAA	AUGGGGUA	UACCCCAUC	CUUAAGGU
	5587	AAAACCUU	CUGAUGA	X	GAA	AGGAUGGG	CCCAUCCUU	AAGGUUUU
	5588	GAAAACCU	CUGAUGA	X	GAA	AAGGAUGG	CCAUCCUUA	AGGUUUUC
	5593	AGACAGAA	CUGAUGA	X	GAA	ACCUUAAG	CUUAAGGUU	UUCUGUCU
	5594	CAGACAGA	CUGAUGA	X	GAA	AACCUUAA	UUAAGGUUU	UCUGUCUG
15	5595	UCAGACAG	CUGAUGA	X	GAA	AAACCUUA	UAAGGUUUU	CUGUCUGA
	5596	AUCAGACA	CUGAUGA	X	GAA	AAAACCUU	AAGGUUUUC	UGUCUGAU
	5600	UCUCAUCA	CUGAUGA	X	GAA	ACAGAAAA	UUUUCUGUC	UGAUGAGA
	5627	UCAGUGGG	CUGAUGA	X	GAA	AUUGCACU	AGUGCAAUC	CCCACUGA
	5660	UGCACCAA	CUGAUGA	X	GAA	AGCCACAG	CUGUGGCUC	UUGGUGCA
20	5662	AGUGCACC	CUGAUGA	X	GAA	AGAGCCAC	GUGGCUCUU	GGUGCACU
	5671	UGGCUGGU	CUGAUGA	X	GAA	AGUGCACC	GGUGCACUC	ACCAGCCA
	5685	UACUUGUC	CUGAUGA	X	GAA	AGUCCUGG	CCAGGACUA	GACAAGUA
	5693	CCCUUUCC	CUGAUGA	X	GAA	ACUUGUCU	AGACAAGUA	GGAAAGGG
	5704	GUGGCUAG	CUGAUGA	X	GAA	AGCCCUUU	AAAGGGCUU	CUAGCCAC
25	5705	UGUGGCUA	CUGAUGA	X	GAA	AAGCCCUU	AAGGGCUUC	UAGCCACA
	5707	AGUGUGGC	CUGAUGA	X	GAA	AGAAGCCC	GGGCUUCUA	GCCACACU
	5731	CCCUACCU	CUGAUGA	X	GAA	AUUUUCUU	AAGAAAAUC	AGGUAGGG
	5736	GCCAGCCC	CUGAUGA	X	GAA	ACCUGAUU	AAUCAGGUA	GGGCUGGC
	5754	UGGACAAA	CUGAUGA	X	GAA	AUGUCUUU	AAAGACAUC	UUUGUCCA
30	5756	AAUGGACA	CUGAUGA	X	GAA	AGAUGUCU	AGACAUCUU	UGUCCAUU
	5757	GAAUGGAC	CUGAUGA	X	GAA	AAGAUGUC	GACAUCUUU	GUCCAUUC
	5760	UGCGAAUG	CUGAUGA	X	GAA	ACAAAGAU	AUCUUUGUC	CAUUCGCA
	5764	CUUUUGCG	CUGAUGA	X	GAA	AUGGACAA	UUGUCCAUU	CGCAAAAG

5765	GCUUUUGC CUGAUGA X GAA AAUGGACA	UGUCCAUUC GCAAAAGC
5775	GCCGACAA CUGAUGA X GAA AGCUUUUG	CAAAAGCUC UUGUCGGC
5777	CAGCCGAC CUGAUGA X GAA AGAGCUUU	AAAGCUCUU GUCGGCUG
5780	CUGCAGCC CUGAUGA X GAA ACAAGAGC	GCUCUUGUC GGCUGCAG
5794	GCCUGACU CUGAUGA X GAA ACACACUG	CAGUGUGUA AGUCAGGC
5798	CAUCGCCU CUGAUGA X GAA ACUUACAC	GUGUAAGUC AGGCGAUG
5818	UUCUCUGG CUGAUGA X GAA AGCCUCUG	CAGAGGCUA CCAGAGAA
5852	GGAUGAGA CUGAUGA X GAA ACCUCAGG	CCUGAGGUU UCUCAUCC
5853	UGGAUGAG CUGAUGA X GAA AACCUCAG	CUGAGGUUU CUCAUCCA
5854	CUGGAUGA CUGAUGA X GAA AAACCUCA	UGAGGUUUC UCAUCCAG
5856	AUCUGGAU CUGAUGA X GAA AGAAACCU	AGGUUUCUC AUCCAGAU
5859	GAUAUCUG CUGAUGA X GAA AUGAGAAA	UUUCUCAUC CAGAUAUC
5865	UUGCUGGA CUGAUGA X GAA AUCUGGAU	AUCCAGAUA UCCAGCAA
5867	AAUUGCUG CUGAUGA X GAA AUAUCUGG	CCAGAUAUC CAGCAAUU
5875	CACCCCCC CUGAUGA X GAA AUUGCUGG	CCAGCAAUU GGGGGGUG
5896	GGACCAUC CUGAUGA X GAA AUGGUCUU	AAGACCAUA GAUGGUCC
5903	UAAUACAG CUGAUGA X GAA ACCAUCUA	UAGAUGGUC CUGUAUUA
5908	CGGAAUAA CUGAUGA X GAA ACAGGACC	GGUCCUGUA UUAUUCCG
5910	AUCGGAAU CUGAUGA X GAA AUACAGGA	UCCUGUAUU AUUCCGAU
5911	AAUCGGAA CUGAUGA X GAA AAUACAGG	CCUGUAUUA UUCCGAUU
5913	AAAAUCGG CUGAUGA X GAA AUAAUACA	UGUAUUAUU CCGAUUUU
5914	UAAAAUCG CUGAUGA X GAA AAUAAUAC	GUAUUAUUC CGAUUUUA
5919	AUUAUUAA CUGAUGA X GAA AUCGGAAU	AUUCCGAUU UUAAUAAU
5920	GAUUAUUA CUGAUGA X GAA AAUCGGAA	UUCCGAUUU UAAUAAUC
5921	AGAUUAUU CUGAUGA X GAA AAAUCGGA	UCCGAUUUU AAUAAUCU
5922	UAGAUUAU CUGAUGA X GAA AAAAUCGG	CCGAUUUUA AUAAUCUA
5925	AAUUAGAU CUGAUGA X GAA AUUAAAAU	AUUUUAAUA AUCUAAUU
5928	ACGAAUUA CUGAUGA X GAA AUUAUUAA	UUAAUAAUC UAAUUCGU
5930	UCACGAAU CUGAUGA X GAA AGAUUAUU	AAUAAUCUA AUUCGUGA
5933	UGAUCACG CUGAUGA X GAA AUUAGAUU	AAUCUAAUU CGUGAUCA
5934	AUGAUCAC CUGAUGA X GAA AAUUAGAU	AUCUAAUUC GUGAUCAU
5940	CUCUUAAU CUGAUGA X GAA AUCACGAA	UUCGUGAUC AUUAAGAG
5943	AGUCUCUU CUGAUGA X GAA AUGAUCAC	GUGAUCAUU AAGAGACU

	5944	AAGUCUCU	CUGAUGA	X	GAA	AAUGAUCA	UGAUCAUUA	AGAGACUU
	5952	AUUUACUA	CUGAUGA	X	GAA	AGUCUCUU	AAGAGACUU	UAGUAAAU
	5953	CAUUUACU	CUGAUGA	X	GAA	AAGUCUCU	AGAGACUUU	AGUAAAUG
	5954	ACAUUUAC	CUGAUGA	X	GAA	AAAGUCUC	GAGACUUUA	GUAAAUGU
5	5957	GGGACAUU	CUGAUGA	X	GAA	ACUAAAGU	ACUUUAGUA	AAUGUCCC
	5963	GGAAAAGG	CUGAUGA	X	GAA	ACAUUUAC	GUAAAUGUC	CCUUUUCC
	5967	UGUGGGAA	CUGAUGA	X	GAA	AGGGACAU	AUGUCCCUU	UUCCCACA
	5968	UUGUGGGA	CUGAUGA	X	GAA	AAGGGACA	UGUCCCUUU	UCCCACAA
	5969	UUUGUGGG	CUGAUGA	X	GAA	AAAGGGAC	GUCCCUUUU	CCCACAAA
10	5970	UUUUGUGG	CUGAUGA	X	GAA	AAAAGGGA	UCCCUUUUC	CCACAAAA
	5981	CUUUUCUU	CUGAUGA	X	GAA	ACUUUUGU	ACAAAAGUA	AAGAAAAG
	5992	AAUCCCGA	CUGAUGA	X	GAA	AGCUUUUC	GAAAAGCUA	UCGGGAUU
	5994	AGAAUCCC	CUGAUGA	X	GAA	AUAGCUUU	AAAGCUAUC	GGGAUUCU
	6000	AACCAGAG	CUGAUGA	X	GAA	AUCCCGAU	AUCGGGAUU	CUCUGGUU
15	6001	GAACCAGA	CUGAUGA	X	GAA	AAUCCCGA	UCGGGAUUC	UCUGGUUC
	6003	CAGAACCA	CUGAUGA	X	GAA	AGAAUCCC	GGGAUUCUC	UGGUUCUG
	6008	UUAAGCAG	CUGAUGA	X	GAA	ACCAGAGA	UCUCUGGUU	CUGCUUAA
	6009	UUUAAGCA	CUGAUGA	X	GAA	AACCAGAG	CUCUGGUUC	UGCUUAAA
	6014	AAGUCUUU	CUGAUGA	X	GAA	AGCAGAAC	GUUCUGCUU	AAAGACUU
20	6015	UAAGUCUU	CUGAUGA	X	GAA	AAGCAGAA	UUCUGCUUA	AAGACUUA
	6022	CCAAAGCU	CUGAUGA	X	GAA	AGUCUUUA	UAAAGACUU	AGCUUUGG
	6023	UCCAAAGC	CUGAUGA	X	GAA	AAGUCUUU	AAAGACUUA	GCUUUGGA
	6027	AGGCUCCA	CUGAUGA	X	GAA	AGCUAAGU	ACUUAGCUU	UGGAGCCU
	6028	UAGGCUCC	CUGAUGA	X	GAA	AAGCUAAG	CUUAGCUUU	GGAGCCUA
25	6036	AACUUUCA	CUGAUGA	X	GAA	AGGCUCCA	UGGAGCCUA	UGAAAGUU
	6044	GGCUGAUC	CUGAUGA	X	GAA	ACUUUCAU	AUGAAAGUU	GAUCAGCC

Where "X" represents stem II region of a HH ribozyme (Hertel et al., 1992 *Nucleic Acids Res.* 20 3252). The length of stem II may be ≥ 2 base-pairs.

Table IX: Mouse *flt1* VEGF Receptor-Hairpin Ribozyme and Substrate Sequence

nt. Position	HP Ribozyme Sequence	Substrate
33	GUCCCAGC AGAA GACCAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGGUCA GCU GCUGGGAC
36	GGUGUCCC AGAA GCUGAC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUCAGCU GCU GGGACACC
50	UAAGGCAA AGAA GCGGUG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACCGCG GUC UUGCCUUA
67	GACACCCG AGAA GCGCGU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACGCGCU GCU CGGGUGUC
79	CUGUGAGA AGAA GACACC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUGUCU GCU UCUCACAG
166	GAAAGAGA AGAA GGCCUG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAGGCCA GAC UCUCUUUC
197	CAUGAGUG AGAA GCCUCC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAGGCA GCC CACUCAUG
214	CGGUCGUG AGAA GAGACC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUCUCU GCC CACGACCG
266	CUCCCACA AGAA GAUGGG ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCAUCG GCC UGUGGGAG
487	GGAUGAUG AGAA GUCUUC ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAGACA GCU CAUCAUCC
501	CGUCACCC AGAA GGGGAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCCCCU GCC GGGUGACG
566	CUUUGCCC AGAA GGGGUA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UACCCCU GAU GGGCAAAG
640	CGCAGUUC AGAA GUCCUA ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UAGGACU GCU GAACUGCG
691	GCCGAUGG AGAA GAUAGU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUAUCU GAC CCAUCGGC
703	UUGUAUUG AGAA GCCGAU ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCGGCA GAC CAAUACAA

736	CUGGGCUC AGAA GGCGUA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UACGCCC GCC GAGCCCAG
754	GCCCGUGG AGAA GUCUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAGACU GCU CCACGGGC
766	GGACAAGA AGAA GCCCGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACGGGCA GAC UCUUGUCC
871	UCCGGUCA AGAA GCUGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCAGCG GAU UGACCGGA
960	CUUCACGC AGAA GGUGUA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UACACCU GUC GCGUGAAG
988	UGUUGAAA AGAA GGAACG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGUUCCA GUC UUUCAACA
1051	CCUGCACC AGAA GCUUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAAGCA GCC GGUGCAGG
1081	GCCGAUAG AGAA GUCUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAGACG GUC CUAUCGGC
1090	UCAUGGAC AGAA GAUAGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUAUCG GCU GUCCAUGA
1093	CUUUCAUG AGAA GCCGAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCGGCU GUC CAUGAAAG
1169	AAAUAGCG AGAA GACUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAGUCU GCU CGCUAUUU
1315	UUUCGUAG AGAA GAGGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACCUCA GAU CUACGAAA
1363	UGCUGCCC AGAA GAUAGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUAUCC GCU GGGCAGCA
1604	GUCUGAGA AGAA GCCACC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUGGCU GAC UCUCAGAC
1612	UUCCAGGG AGAA GAGAGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUCUCA GAC CCCUGGAA
1629	GGCCCGGC AGAA GUAGAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCUACA GCU GCCGGGCC
1632	GAAGGCCC AGAA GCUGUA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UACAGCU GCC GGGCCUUC
1688	UUCGGCAC AGAA GUGACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUCACA GAU GUGCCGAA
1730	UCUCCUUC AGAA GGCAUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAUGCCA GCC GAAGGAGA

1753	CCACACAG AGAA GUUUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAAACU GUC CUGUGUGG
2017	GGUUUUGA AGAA GGUGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACACCU GCU UCAAAACC
2101	ACCAAGUG AGAA GAGGCG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CGCCUCA GAU CACUUGGU
2176	UUUCAAUA AGAA GCGUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCACGCU GUU UAUUGAAA
2258	GUGAGGUA AGAA GCGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCGCA GCC UACCUCAC
2305	UGAGCGUG AGAA GCUCCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGAGCU GAU CACGCUCA
2383	CGGAAGAA AGAA GCUUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAAGCG GUC UUCUUCCG
2405	GACAGGUA AGAA GUCUUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAAGACA GAC UACCUGUC
2432	GGAACUUC AGAA GGGUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGACCCA GAU GAAGUUCC
2464	CAUAGGGC AGAA GUUCAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUGAACG GCU GCCCUAUG
2467	CAUCAUAG AGAA GCCGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACGGCU GCC CUAUGAUG
2592	CACAGUCC AGAA GGUGGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCACCU GCC GGACUGUG
2596	CAGCCACA AGAA GGCAGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUGCCG GAC UGUGGCUG
2653	GUUCGGUC AGAA GAGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCUCU GAU GACCGAAC
2743	CGAUCACC AGAA GAGGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCCUCU GAU GGUGAUCG
2779	GGUAGUUG AGAA GGUUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAAACCU GUC CAACUACC
2814	CUUGUUGA AGAA GAAUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUAUUCU GUC UCAACAAG
2831	AUAUGCAA AGAA GCGUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGACGCA GCC UUGCAUAU
2895	ACUGUCUA AGAA GGGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCCCC GCC UAGACAGU

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2913	GACACUUG	AGAA	GCUGAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUCAGCA	GCU	CAAGUGUC
2928	GAAGCUGG	AGAA	GGUGAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUCACCA	GCU	CCAGCUUC
2934	UUCAGGGA	AGAA	GGAGCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGCUCCA	GCU	UCCCUGAA
3001	UGGUGAGG	AGAA	GCUUGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCAAGCA	GCC	CCUCACCA
3022	UGUAGGAA	AGAA	GGUCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGACCU	GAU	UUCCUACA
3033	CACUUGGA	AGAA	GUAGGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCUACA	GUU	UCCAAGUG
3064	UUCUGGAG	AGAA	GAAACU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGUUUCU	GUC	CUCCAGAA
3179	CUCACAUA	AGAA	GGGUUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAACCCU	GAU	UAUGUGAG
3357	CUUCAGGC	AGAA	GCAGAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCUGCA	GCC	GCCUGAAG
3360	UUCCUUCA	AGAA	GCUGCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGCAGCC	GCC	UGAAGGAA
3379	GGGUUCUC	AGAA	GCAUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCAUGCG	GAU	GAGAACCC
3463	GUUCAGCA	AGAA	GGGGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCCCCG	GUU	UGCUGAAC
3496	UGGCUUGA	AGAA	GGUCAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUGACCU	GCU	UCAAGCCA
3553	UGUUUCUA	AGAA	GUAUGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCAUACU	GAC	UAGAAACA
3615	AUCUGCAA	AGAA	GUCCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGGACG	GCU	UUGCAGAU
3623	AAAUGUGG	AGAA	GCAAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUUGCA	GAU	CCACAUUU
3650	CUCACAUC	AGAA	GAGCUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAGCUCU	GAU	GAUGUGAG
3754	UAGUGUCC	AGAA	GAUAGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUAUCA	GCU	GGACACUA
3772	GGGAGCCC	AGAA	GAGUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCACUCU	GCU	GGGCUCCC

3796	UCCAGGUG AGAA GCUUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAAGCG GUU CACCUGGA
3881	CUCGGCAG AGAA GAAAGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACUUUCC GAU CUGCCGAG
3886	UGGGCCUC AGAA GAUCGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCGAUCU GCC GAGGCCCA
3897	GAAGCAGA AGAA GGGCCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGGCCCA GCU UCUGCUUC
3903	GCUGGAGA AGAA GAAGCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGCUUCU GCU UCUCCAGC
3912	GUGGCCAC AGAA GGAGAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCUCCA GCU GUGGCCAC
3969	UGGAGAAC AGAA GGACUC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GAGUCCU GCU GUUCUCCA
3972	GGGUGGAG AGAA GCAGGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCCUGCU GUU CUCCACCC
3986	GAGUUGUA AGAA GGGGGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACCCCCA GAC UACAACUC
4018	UUUAGGCG AGAA GGGAGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCUCCCC GCC CGCCUAAA
4022	AAGCUUUA AGAA GGCGGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCGCCC GCC UAAAGCUU
4040	GUUGUCGG AGAA GGUGAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCACCA GCC CCGACAAC
4053	CUGUCAGG AGAA GGUUGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACAACCA GCC CCUGACAG
4095	UCCUGUGG AGAA GAAUAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUAUUCC GCU CCACAGGA
4110	CGAAAAGC AGAA GGCUCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGAGCCA GCU GCUUUUCG
4113	UCACGAAA AGAA GCUGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCAGCU GCU UUUCGUGA
4168	UUAGUCAA AGAA GCAACA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGUUGCU GUU UUGACUAA
4290	GGUGGGCG AGAA GUCGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCGACC GCC CGCCCACC
4294	GGCCGGUG AGAA GGCGGU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	ACCGCCC GCC CACCGGCC

4329	AGUCCCAC	AGAA	GCAGGG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CCCUGCA GCU GUGGGACU
4378	CAGAGCAG	AGAA	GUGCAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUGCACU GAC CUGCUCUG
4383	AGAGACAG	AGAA	GGUCAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGACCU GCU CUGUCUCU
4388	AUAAGAGA	AGAA	GAGCAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGCUCU GUC UCUCUUAU
4457	CUCCACAG	AGAA	GACGCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGCGUCC GUC CUGUGGAG
4525	CCCGAAAC	AGAA	GAGGCC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGCCUCC GCU GUUUCGGG
4528	GGGCCCGA	AGAA	GCGGAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUCCGCU GUU UCGGGCCC
4643	AAACAGAC	AGAA	GAAGAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUCUUCU GUU GUCUGUUU
4650	GGAUGGUA	AGAA	GACAAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUUGUCU GUU UACCAUCC
4724	ACUAGAGG	AGAA	GAUGAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUCAUCA GUU CCUCUAGU
4771	AUGCGAAG	AGAA	GGCCUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAGGCCU GAC CUUCGCAU
4785	UCCCCGUG	AGAA	GUAUGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCAUACU GCU CACGGGGA
4809	CUAGGCCA	AGAA	GGACCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGUCCA GUU UGGCCUAG
4834	UUGAGCCC	AGAA	GUAGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCUACU GAU GGGCUCAA
4912	AUAUAUAA	AGAA	GGAUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUAUCCU GUU UUAUAUAU
5119	UCCUCUCA	AGAA	GCCUUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CAAGGCA GUC UGAGAGGA
5144	UAAAUAUG	AGAA	GAUACU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGUAUCA GCC CAUAUUUA
5287	AGGUAUGA	AGAA	GAUGAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUCAUCU GUU UCAUACCU
5363	CCCCAAAG	AGAA	GGCACC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUGCCC GCU CUUUGGGG

	5462	CCGGCUCC AGAA GGUGUG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CACACCU GCC GGAGCCGG
	5478	GUCUGCCC AGAA GUGACC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUCACA GCU GGGCAGAC
	5486	UAUUCAUC AGAA GCCCAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUGGGCA GAC GAUGAAUA
	5500	UCUCCCAA AGAA GCUAUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AAUAGCU GCU UUGGGAGA
5	5539	CUGGCCCG AGAA GAGAAU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AUUCUCU GAC CGGGCCAG
	5564	CACAGGGG AGAA GGUACC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GGUACCU GCU CCCCUGUG
	5597	UCUCAUCA AGAA GAAAAC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GUUUUCU GUC UGAUGAGA
	5601	CCAGUCUC AGAA GACAGA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UCUGUCU GAU GAGACUGG
	5639	GGGCUGCA AGAA GUCUCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGAGACA GCC UGCAGCCC
10	5646	CCACAGUG AGAA GCAGGC	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	GCCUGCA GCC CACUGUGG
	5781	CACACUGC AGAA GACAAG	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	CUUGUCG GCU GCAGUGUG
	5829	CUGUUCUC AGAA GUUUCU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AGAAACG GAU GAGAACAG
	5842	AAACCUCA AGAA GCUGUU	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	AACAGCA GCC UGAGGUUU
	5915	UUAUUAAA AGAA GAAUAA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UUAUUCC GAU UUUAAUAA
15	6010	AGUCUUUA AGAA GAACCA	ACCAGAGAAACACACGUUGUGGUACAUUACCUGGUA	UGGUUCU GCU UAAAGACU

Table X: Homologous Hammerhead Ribozyme Target Sites Between Human flt-1 and KDR RNA

nt. Position	flt-1 Target Sequence	nt. Position	KDR Target Sequence
3388	CCGGGAU A UUUAUAA	3151	CCGGGAU A UUUAUAA
2174	AAUGUAU A CACAGGG	3069	AgUGUAU c CACAGGG
2990	UGCAAAU A UGGAAAU	2756	UGCAAAU u UGGAAAc
2693	CUCCCUU A UGAUGCC	2459	CUgCCUU A UGAUGCC
2981	GUUGAAU A CUGCAAA	2747	GUgGAAU u CUGCAAA
1359	UAUGGUU A AAAGAUG	2097	UgUGGUU u AAAGAUa
3390	GGGAUAU U UAUAAGA	3153	GGGAUAU U UAUAAag
3391	GGAUAUU U AUAAGAA	3154	GGAUAUU U AUAAagA
2925	ACGUGGU U AACCUGC	2691	AuGUGGU c AACCUuC
7140	UAUUUCU A GUCAUGA	2340	UAcUUCU u GUCAUcA
1785	CAAUAAU A GAAGGAA	1515	CucUAAU u GAAGGAA
2731	GAGACUU A AACUGGG	768	uuGACUU c AACUGGG
3974	GAUGACU A CCAGGGC	1466	GAgGACU u CCAGGGa
6590	UUAAUGU A GAAAGAA	2603	aaAAUGU u GAAAGAA
6705	GCCAUUU A UGACAAA	3227	aCaAUUU u UGACAgA
974	GUCAAAU U ACUUAGA	147	uUCAAAU U ACUUgcA
1872	AUAAAGU U GGGACUG	1602	AcAAAGU c GGGAgaG
2333	ACUUGGU U UAAAAAC	1088	AaaUGGU a UAAAAAu
2775	AAGUGGU U CAAGCAU	1745	AcaUGGU a CAAGCuU
3533	UUCUCCU U AGGUGGG	3296	UUuUCCU U AGGUGcu
3534	UCUCCUU A GGUGGGU	3297	UuUCCUU A GGUGcuU
3625	GUACUCU A CUCCUGA	4054	GagCUCU c CUCCUGu
1814	AGCACCU U GGUUGUG	1059	AGuACCU U GGUUacc
2744	GGCAAAU C ACUUGGA	147	uuCAAAU u ACUUGcA
2783	CAAGCAU C AGCAUUU	796	gAAGCAU C AGCAUaa

3613	GAGAGCU C CUGAGUA	2968	GgaAGCU C CUGAagA
4052	AAGGCCU C GCUCAAG	1923	ucuGCCU u GCUCAAG
5305	UCUCCAU A UCAAAAC	456	ggUCCAU u UCAAAuC
7158	AUGUAUU U UGUAUAC	631	gUcUAUU a UGUAcAu
1836	CUAGAAU U UCUGGAA	1007	aUgGAAU c UCUGGug
2565	CUCUCUU C UGGCUCC	2328	uguUCUU C UGGCUaC
4250	CUGUACU C CACCCCA	3388	uUaUACU a CACCagA
7124	ACAUGGU U UGGUCCU	3778	cagUGGU a UGGUuCU
436	AUGGUCU U UGCCUGA	1337	AcGGUCU a UGCCauu
2234	GCACCAU A CCUCCUG	1344	augCCAU u CCUCCcc
2763	GGGCUUU U GGAAAAG	990	uuGCUUU U GGAAguG
4229	CCAGACU A CAACUCG	767	auuGACU u CAACUgG
5301	GUUUUCU C CAUAUCA	3307	ugcUUCU C CAUAUCc
6015	AGAAUGU A UGCCUCU	1917	AcuAUGU c UGCCUug
6095	AUUCCCU A GUGAGCC	1438	AUaCCCU u GUGAaga
6236	UGUUGUU C CUCUUCU	76	UagUGUU u CUCUUga
5962	GCUUCCU U UUAUCCA	3099	auaUCCU c UUAUCgg
7629	UAUAUAU U CUCUGCU	3096	gAaAUAU c CUCUuaU

Lowercase letters are used to represent sequence variance between flt-1 and KDR RNA

Table XI: 2.5 μmol RNA Synthesis Cycle

Reagent	Equivalents	Amount	Wait Time*
Phosphoramidites	6.5	163μL	2.5
S-Ethyl Tetrazole	23.8	238μL	2.5
Acetic Anhydride	100	233 μL	5 sec
N-Methyl Imidazole	186	233 μL	5 sec
TCA	83.2	1.73 mL	21 sec
Iodine	8.0	1.18 mL	45 sec
Acetonitrile	NA	6.67 mL	NA

Claims

1. Nucleic acid molecule which modulates the synthesis, expression and/or stability of an mRNA encoding one or more receptors of vascular endothelial growth factor.

2. The nucleic acid of claim 1, wherein said receptor is flt-1, KDR and/or flk-1.

3. The nucleic acid of claim 1 or 2, wherein said molecule is an enzymatic nucleic acid molecule.

4. The nucleic acid molecule of claim 3, wherein, the binding arms of said enzymatic nucleic acid contain sequences complementary to the substrate nucleotide base sequences in any one of Tables II to IX.

5. The nucleic acid molecule of claims 3 or 4, wherein said nucleic acid molecule is in a hammerhead motif.

6. The enzymatic nucleic acid molecule of claim 3 or 4, wherein said nucleic acid molecule is in a hairpin, hepatitis Delta virus, group I intron, VS nucleic acid or RNaseP nucleic acid motif.

7. The enzymatic nucleic acid molecule of any of claims 3 or 4, wherein said ribozyme comprises between 12 and 100 bases complementary to the RNA of said region.

8. The enzymatic nucleic acid of claim 7, wherein said ribozyme comprises between 14 and 24 bases complementary to the RNA of said region.

9. Enzymatic nucleic acid molecule consisting essentially of any ribozyme sequence selected from those shown in Tables II to IX.

10. A mammalian cell including a nucleic acid molecule of any of claims 1, 2 or 3.

11. The cell of claim 10, wherein said cell is a human cell.

12. An expression vector comprising nucleic acid encoding the nucleic acid molecule of any of claims 1, 2, 3 or 4, in a manner which allows expression and/or delivery of that RNA molecule within a mammalian cell.

13. The expression vector of claim 12, wherein said nucleic acid is an enzymatic nucleic acid.

14. A mammalian cell including an expression vector of any of claims 12 or 13.

15. The cell of claim 14, wherein said cell is a human cell.

16. A method for treatment of a patient having a condition associated with the level of flt-1, KDR and/or flk-1, wherein the patient, tissue donor or population of corresponding cells is administered a therapeutically effective amount of an enzymatic nucleic acid molecule of claims 1, 2, 3 or 4.

17. A method for treatment of a condition related to the level of flt-1, KDR and/or flk-1 activity by administering to a patient an expression vector of claim 12.

18. The method of claims 16 or 17, wherein said patient is a human.

19. The nucleic acid of claim 1 or 2, wherein said molecule is an antisense nucleic acid molecule.

20. The nucleic acid molecule of claim 19, wherein, said antisense nucleic acid contain sequences complementary to the substrate nucleotide base sequences in any one of Tables II to IX.

21. An expression vector comprising nucleic acid encoding the antisense nucleic acid molecule of any one of claims 19 or 20, in a manner which allows expression and/or delivery of that antisense RNA molecule within a mammalian cell.

22. A mammalian cell including an expression vector of claim 21.

23. The cell of claim 22, wherein said cell is a human cell.

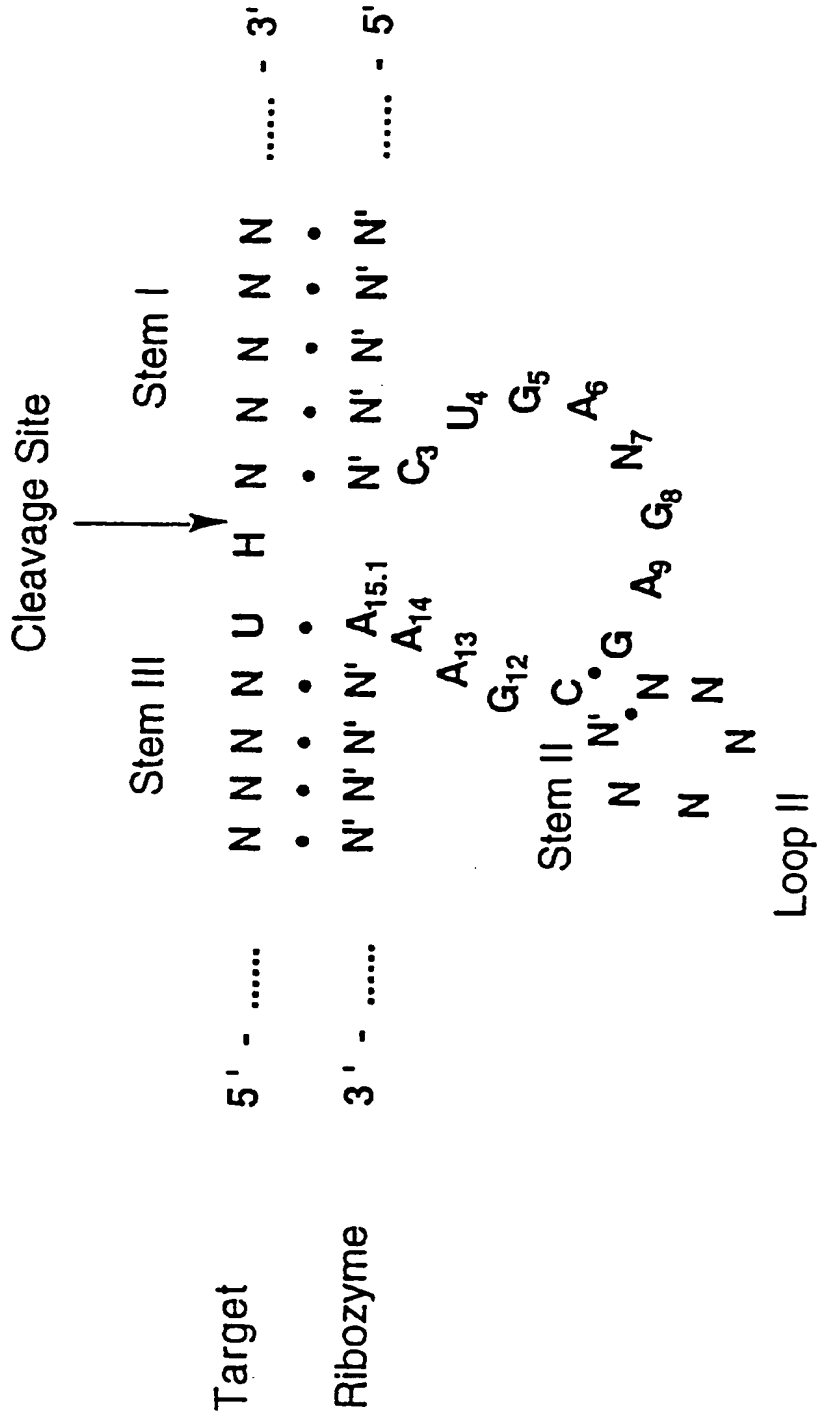

Cleavage Site
Stem I
Stem III
Stem II
Loop II
Target
Ribozyme
5' - ..... N N N N U H N N N N N ..... - 3'
3' - ..... N' N' N' N' A15.1 A14 A13 G12 C N' G N N N N' N' N' N' ..... - 5'
C3 U4 G5 A6 N7 G8 A9

FIG. 1.

FIG. 2b.

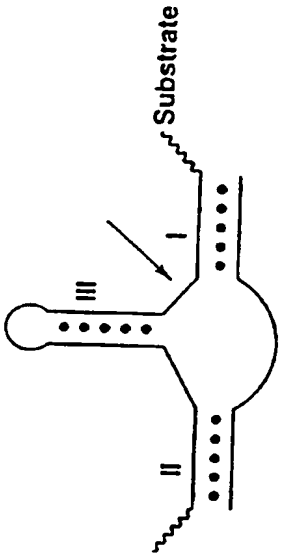


FIG. 2d.

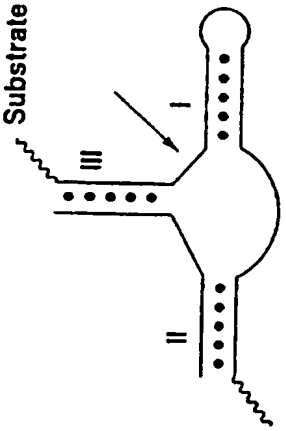


FIG. 2a.

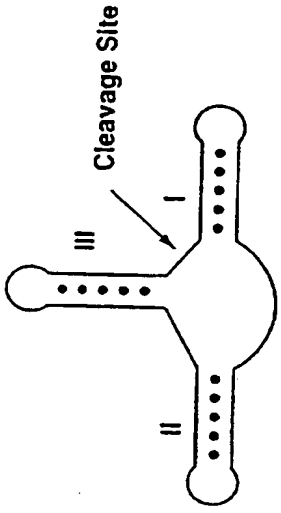
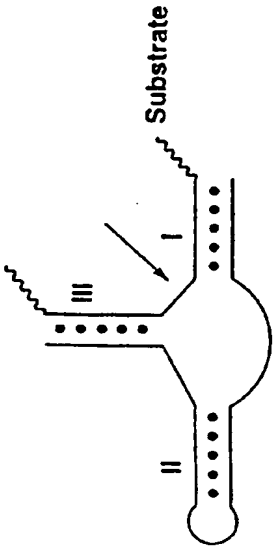


FIG. 2c.



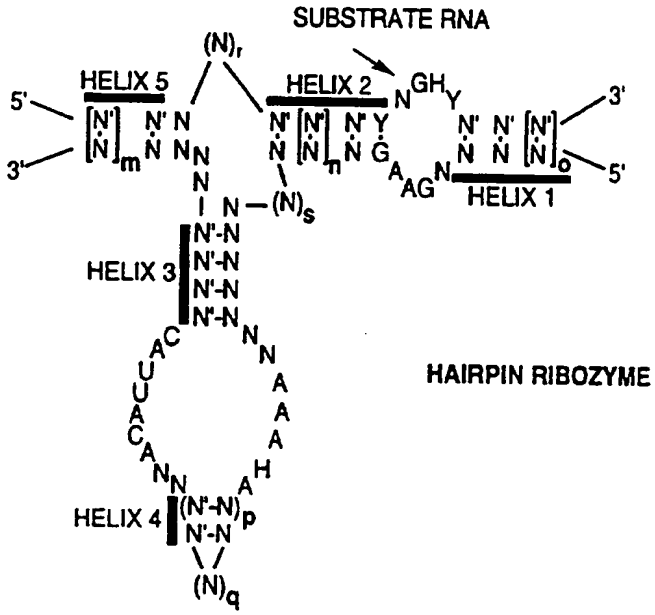

SUBSTRATE RNA
HELIX 5
HELIX 2
HELIX 1
HELIX 3
HELIX 4
HAIRPIN RIBOZYME

FIG. 3.

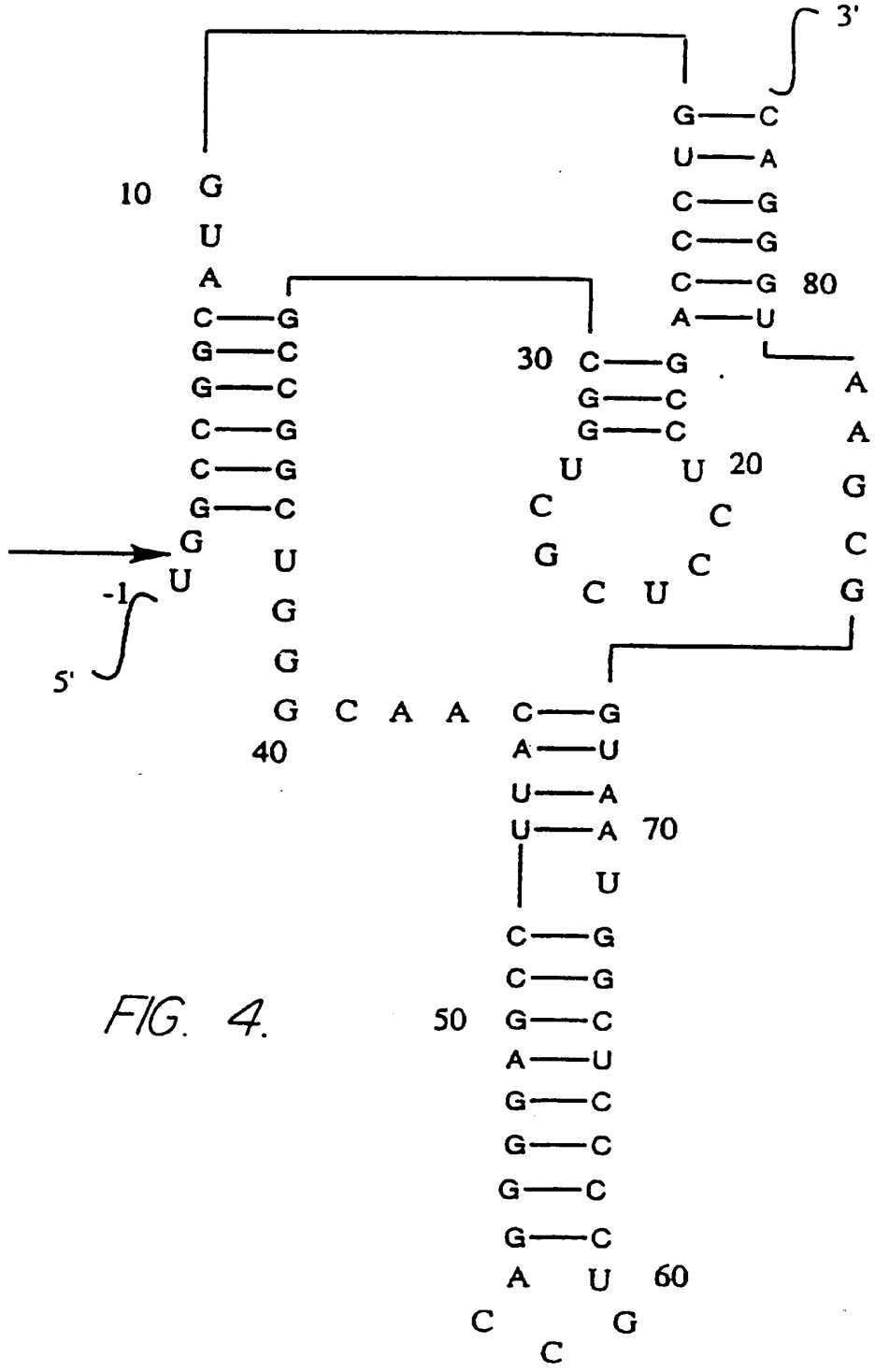


FIG. 4.

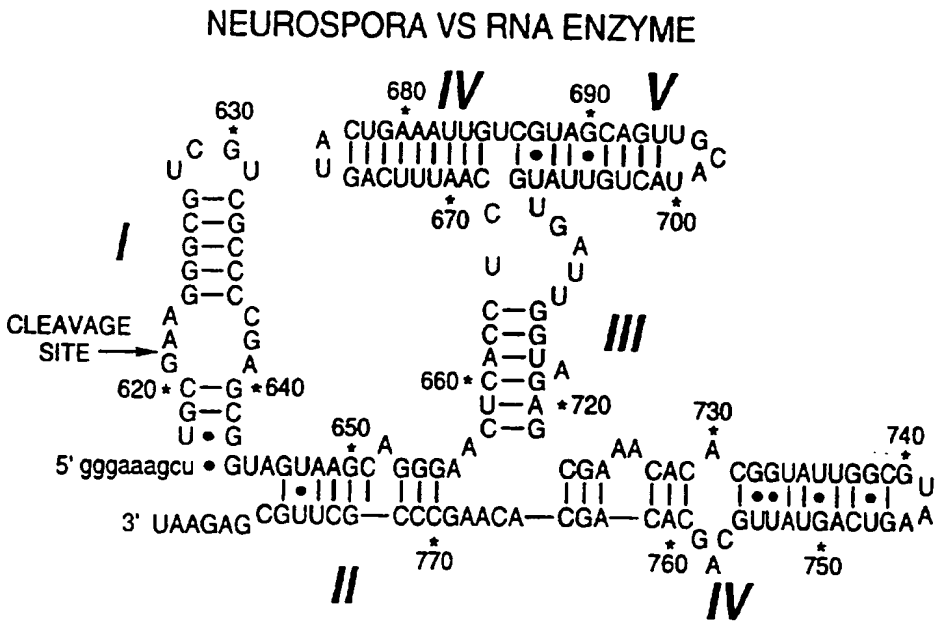

NEUROSPORA VS RNA ENZYME
I
II
III
IV
V
CLEAVAGE SITE
5' gggaaagcu • GUAGUAAGC GGGA CGA CAC CGGUAUUGGCG U
3' UAAGAG CGUUCG—CCCGAACA—CGA—CAC GUUAUGACUGA A
CUGAAAUUGUCGUAGCAGUU G
GACUUUAAC GUAUUGUCAU A
630
620
640
650
660
670
680
690
700
720
730
740
750
760
770

FIG. 5.

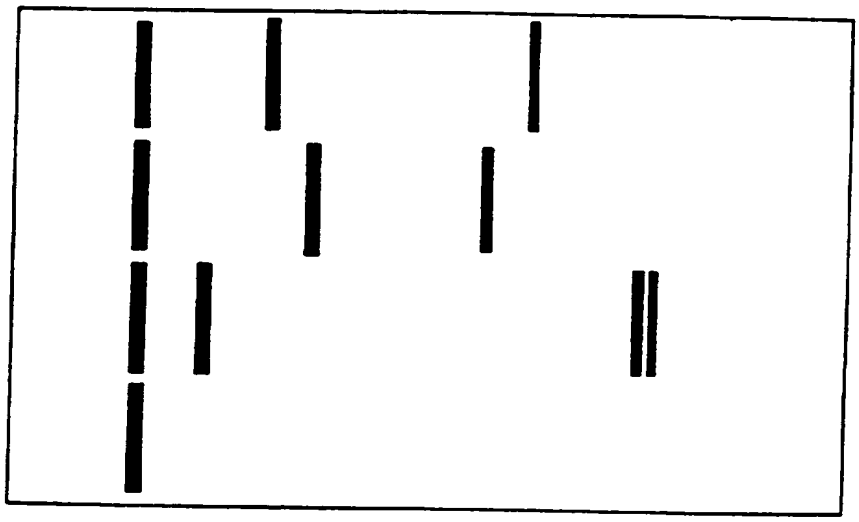
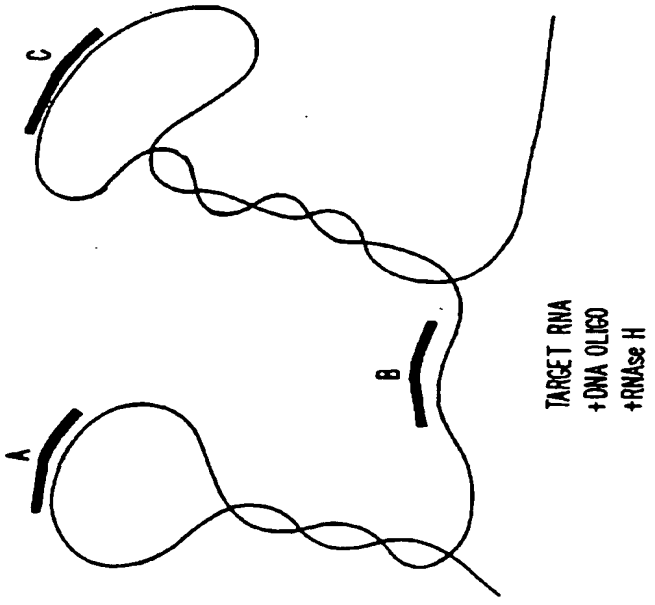


FIG. 6.



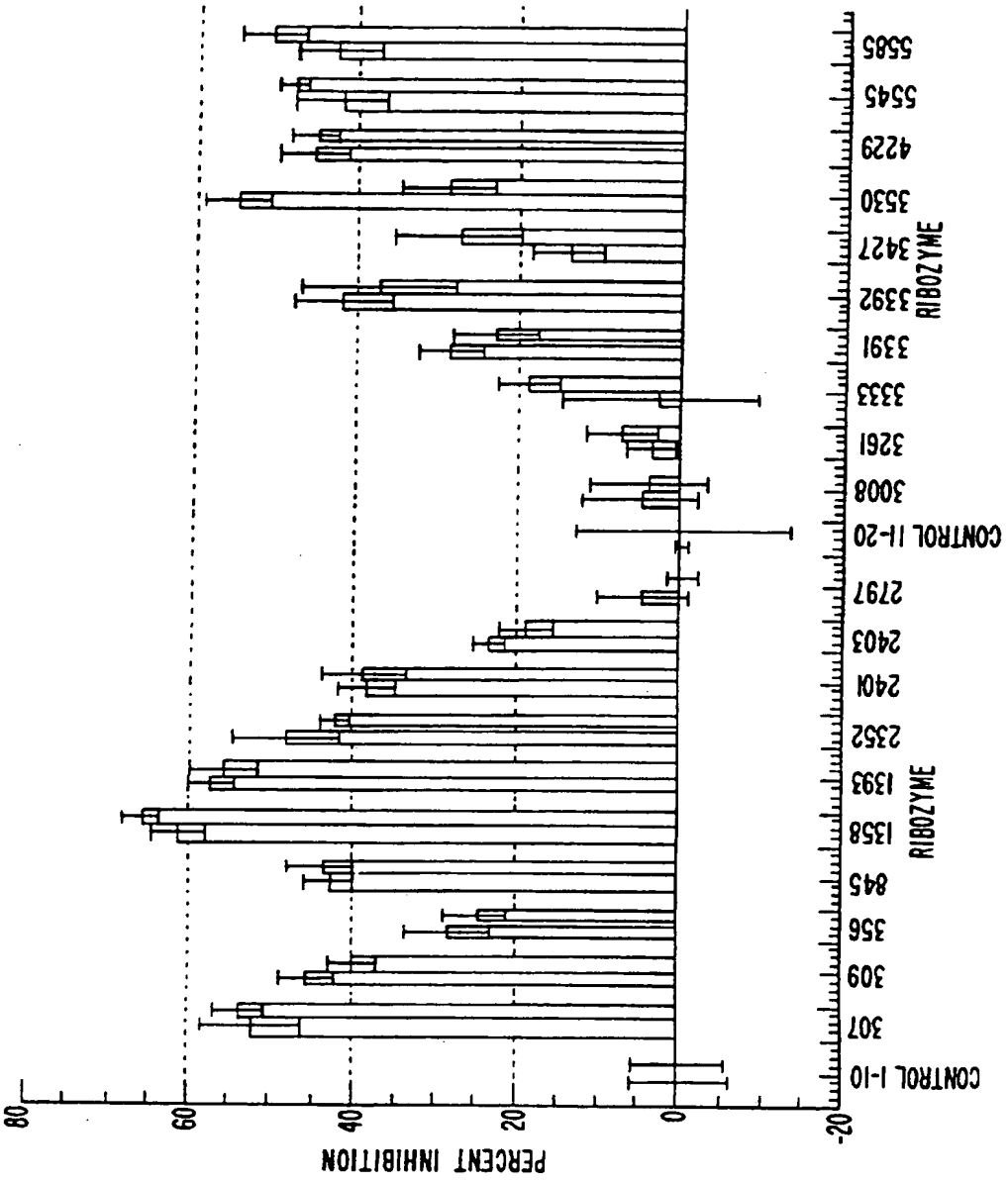

PERCENT INHIBITION
80
60
40
20
0
-20
CONTROL 1-10
307
309
356
845
1358
1393
2352
2401
2403
2797
CONTROL 11-20
3008
3261
3333
3391
3392
3427
3530
4229
5545
5585
RIBOZYME
RIBOZYME

FIG. 7.

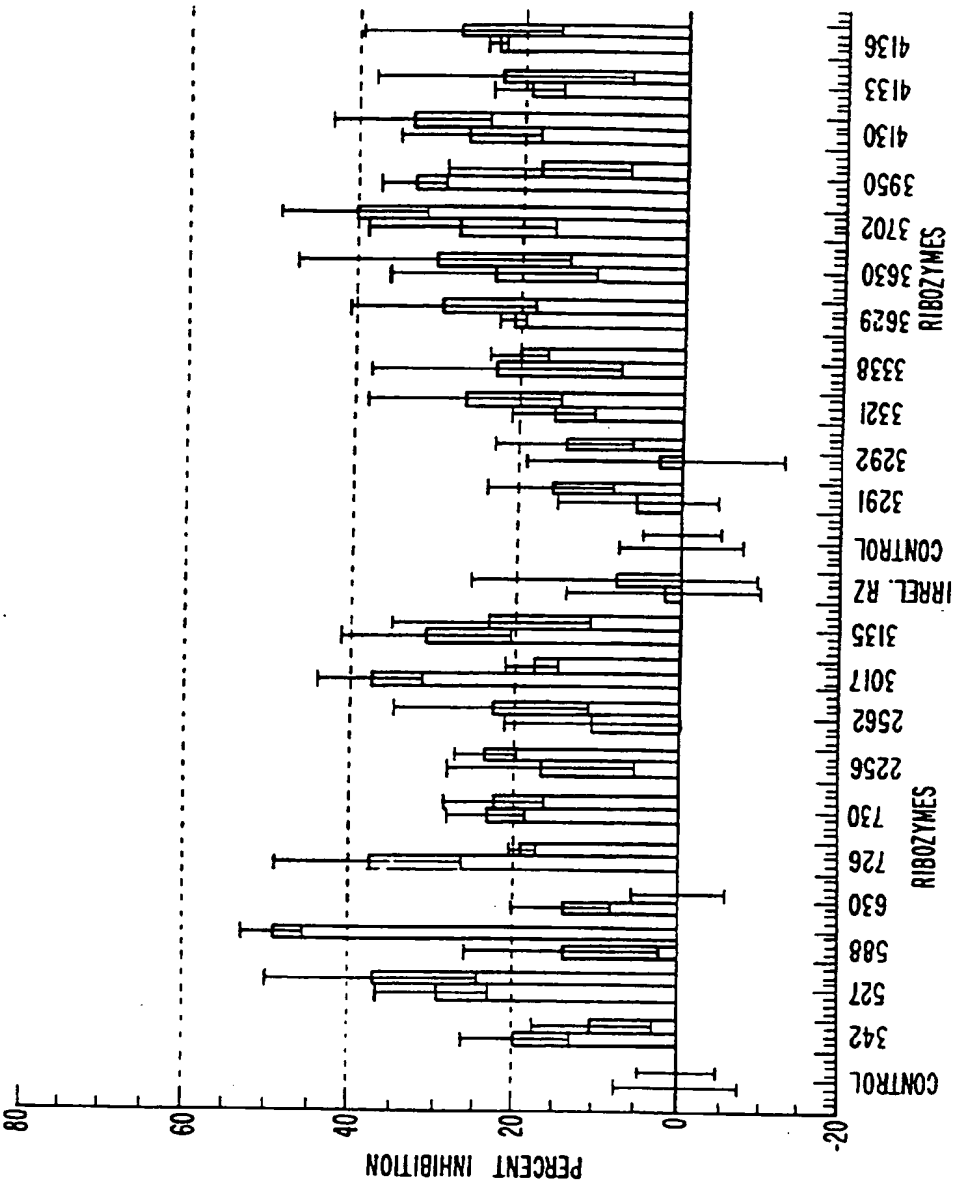

PERCENT INHIBITION
80
60
40
20
0
-20
CONTROL
342
527
588
630
726
730
2256
2562
3017
3135
IRREL. RZ
CONTROL
3291
3292
3321
3338
3629
3630
3702
3950
4130
4133
4136
RIBOZYMES
RIBOZYMES

FIG. 8.

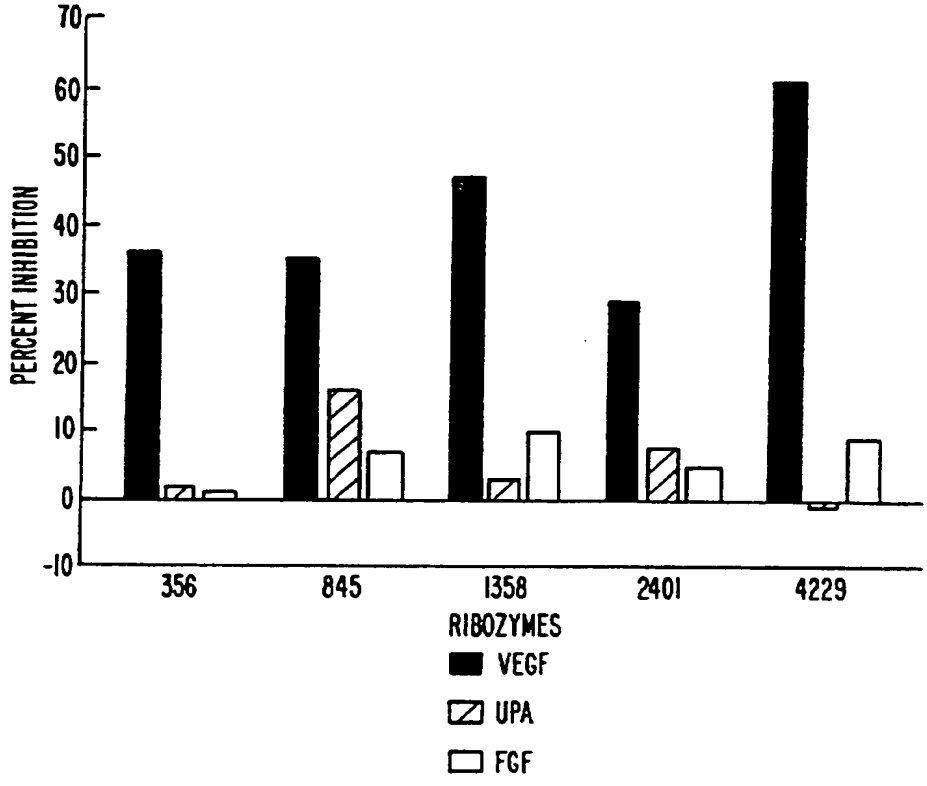
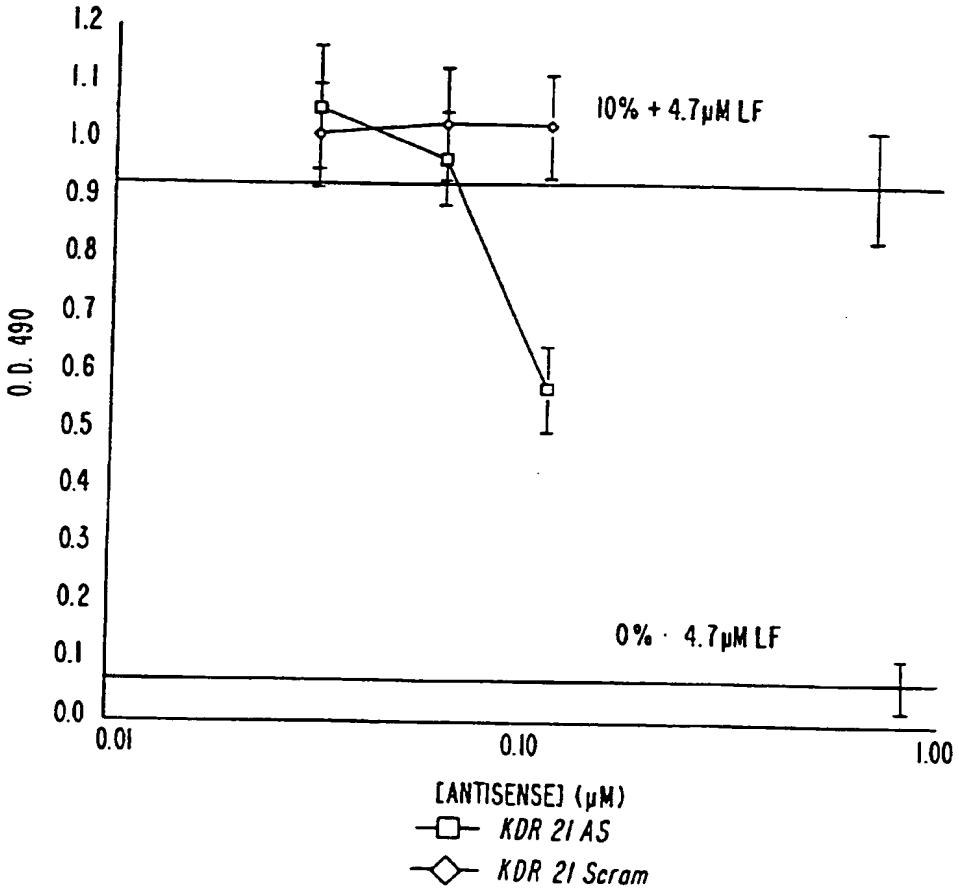

70
60
50
40
30
20
10
0
-10
PERCENT INHIBITION
356
845
1358
2401
4229
RIBOZYMES
VEGF
UPA
FGF

FIG. 9.

FIG. 10.


1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
O.D. 490
10% + 4.7μM LF
0% · 4.7μM LF
0.01
0.10
1.00
[ANTISENSE] (μM)
KDR 21 AS
KDR 21 Scram

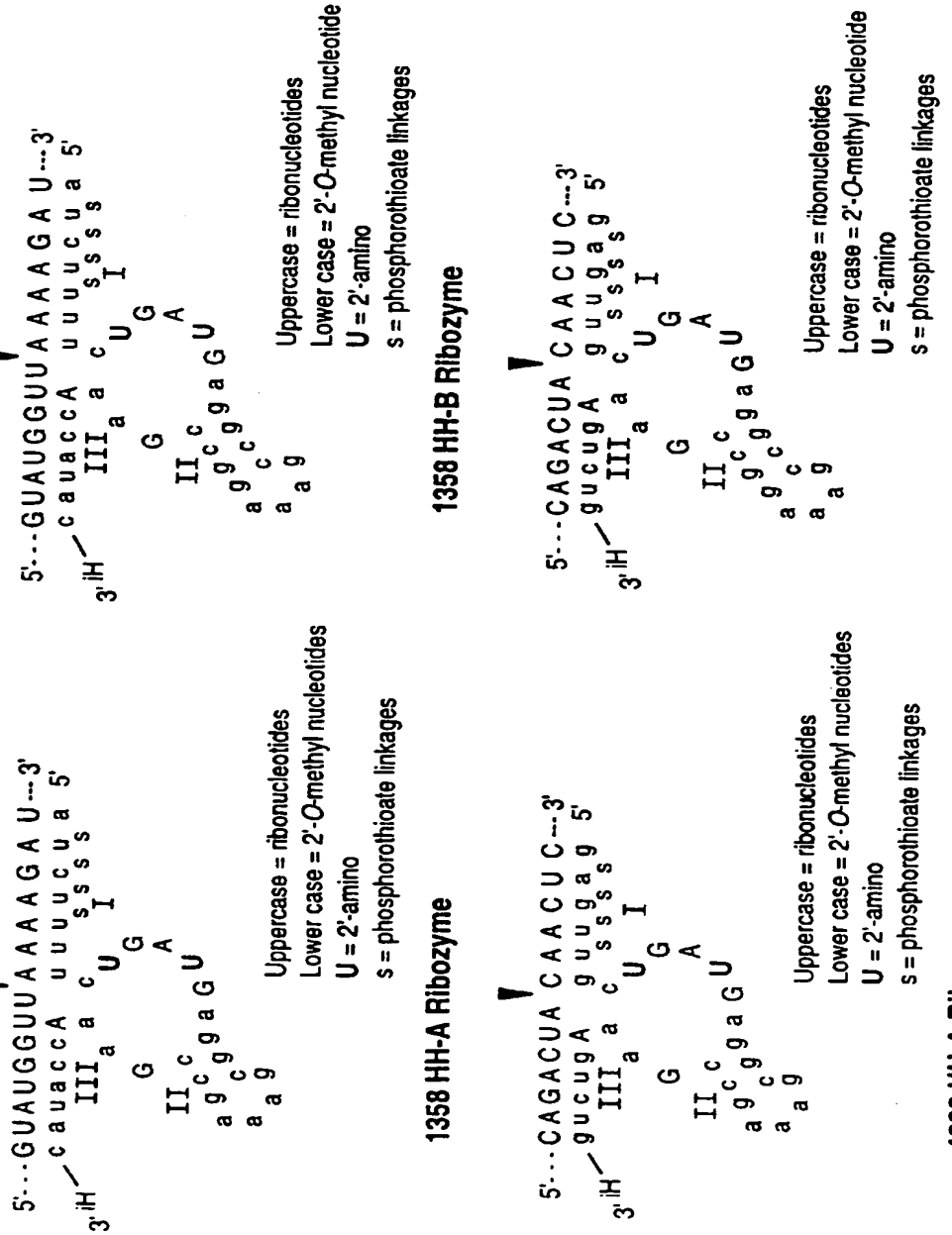

5'---GUAUGGUUAAAAGAU---3'
cauaccA uuuucua 5'
3'iH a c U G I sssss
G A
II c
agcggaGU
a c
a g
Uppercase = ribonucleotides
Lower case = 2'-O-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages
1358 HH-A Ribozyme
5'---GUAUGGUUAAAAGAU---3'
cauaccA uuuucua 5'
3'iH a c U G I sssss
G A
II c
agcggaGU
a c
a g
Uppercase = ribonucleotides
Lower case = 2'-O-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages
1358 HH-B Ribozyme
5'---CAGACUACAACUC---3'
gucugA guugag 5'
3'iH a c U G I sssss
G A
II c
agcggaGU
a c
a g
Uppercase = ribonucleotides
Lower case = 2'-O-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages
4229 HH-A Ribozyme
5'---CAGACUACAACUC---3'
gucugA guugag 5'
3'iH a c U G I sssss
G A
II c
agcggaGU
a c
a g
Uppercase = ribonucleotides
Lower case = 2'-O-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages
4229 HH-B Ribozyme

FIG. 11A.

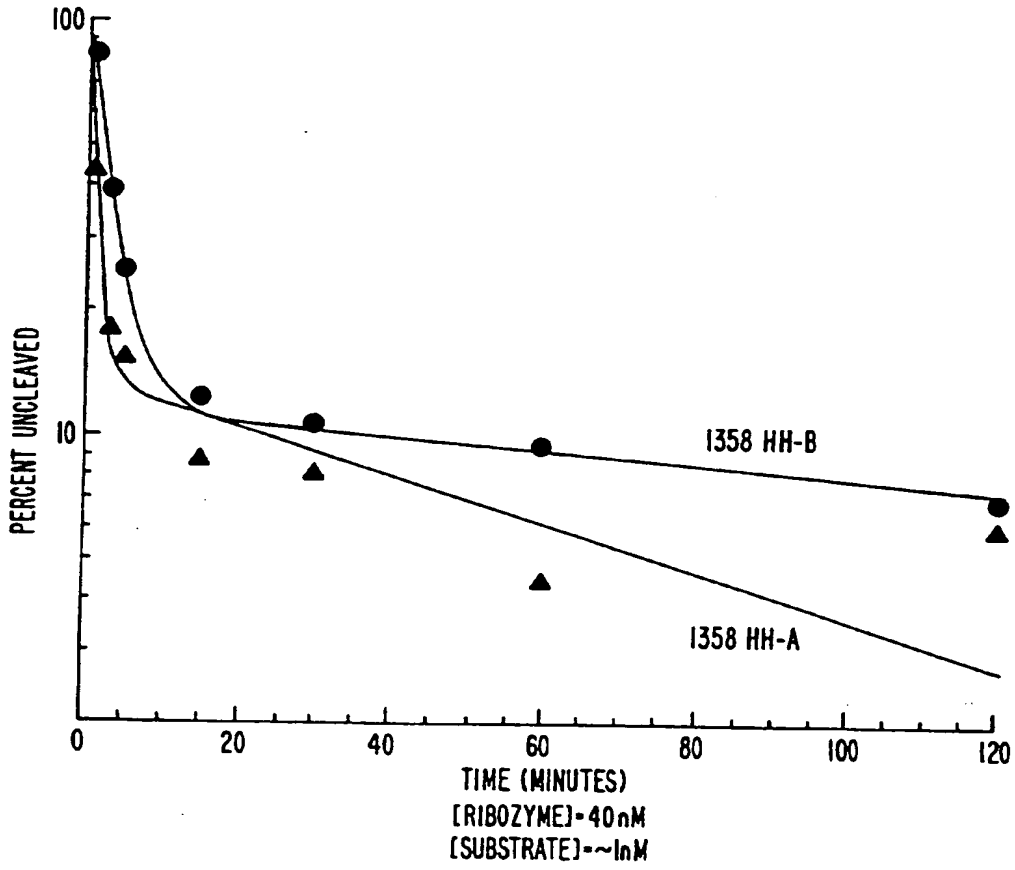
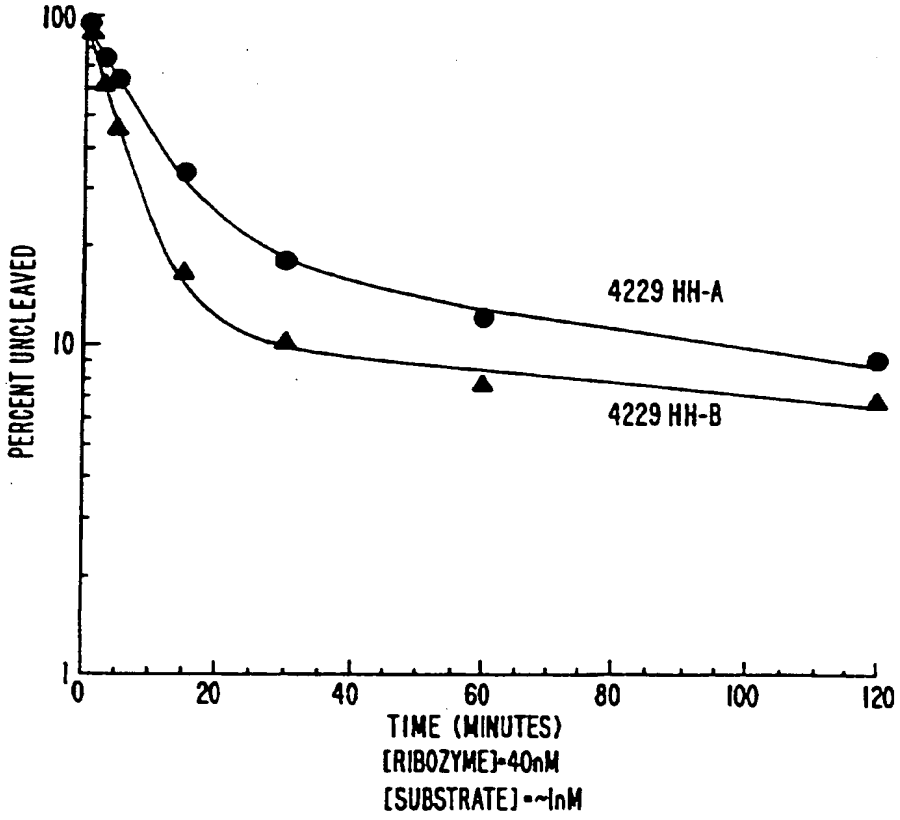
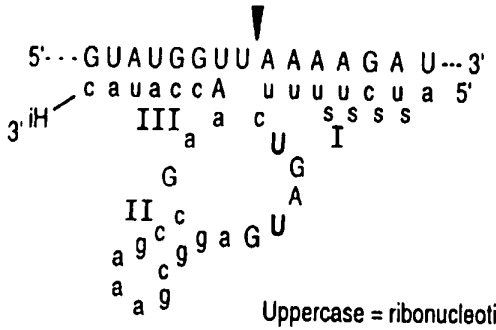

100
10
PERCENT UNCLEAVED
1358 HH-B
1358 HH-A
0
20
40
60
80
100
120
TIME (MINUTES)
[RIBOZYME]=40nM
[SUBSTRATE]=~1nM

FIG. 11B.

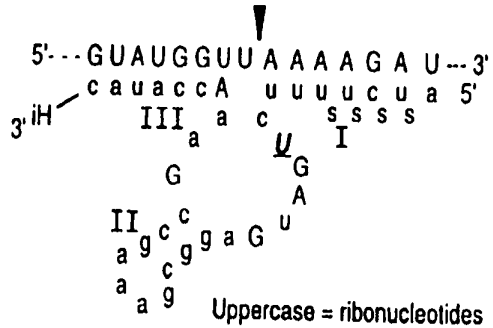
FIG. 11C.


100
10
1
PERCENT UNCLEAVED
0
20
40
60
80
100
120
TIME (MINUTES)
4229 HH-A
4229 HH-B
[RIBOZYME]=40nM
[SUBSTRATE]=~1nM



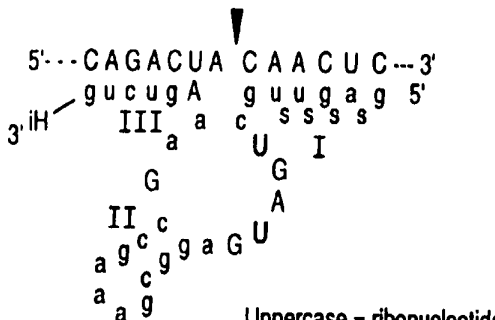
Uppercase = ribonucleotides
Lower case = 2'-*O*-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages

1358 HH (2'-Amino) Ribozyme



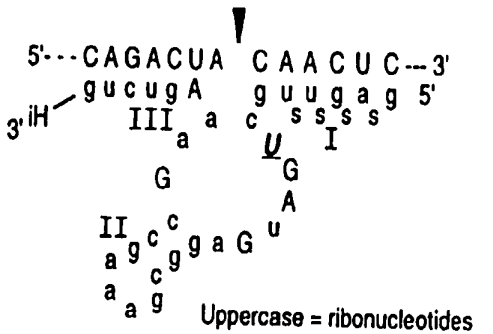
Uppercase = ribonucleotides
Lower case = 2'-*O*-methyl nucleotides
U = 2'-*C*-Allyl
s = phosphorothioate linkages

1358 HH (2'-*C*-Allyl) Ribozyme



Uppercase = ribonucleotides
Lower case = 2'-*O*-methyl nucleotides
U = 2'-amino
s = phosphorothioate linkages

4229 HH (2'-Amino) Ribozyme



Uppercase = ribonucleotides
Lower case = 2'-*O*-methyl nucleotides
U = 2'-*C*-Allyl
s = phosphorothioate linkages

4229 HH (2'-*C*-Allyl) Ribozyme

FIG. 12A.

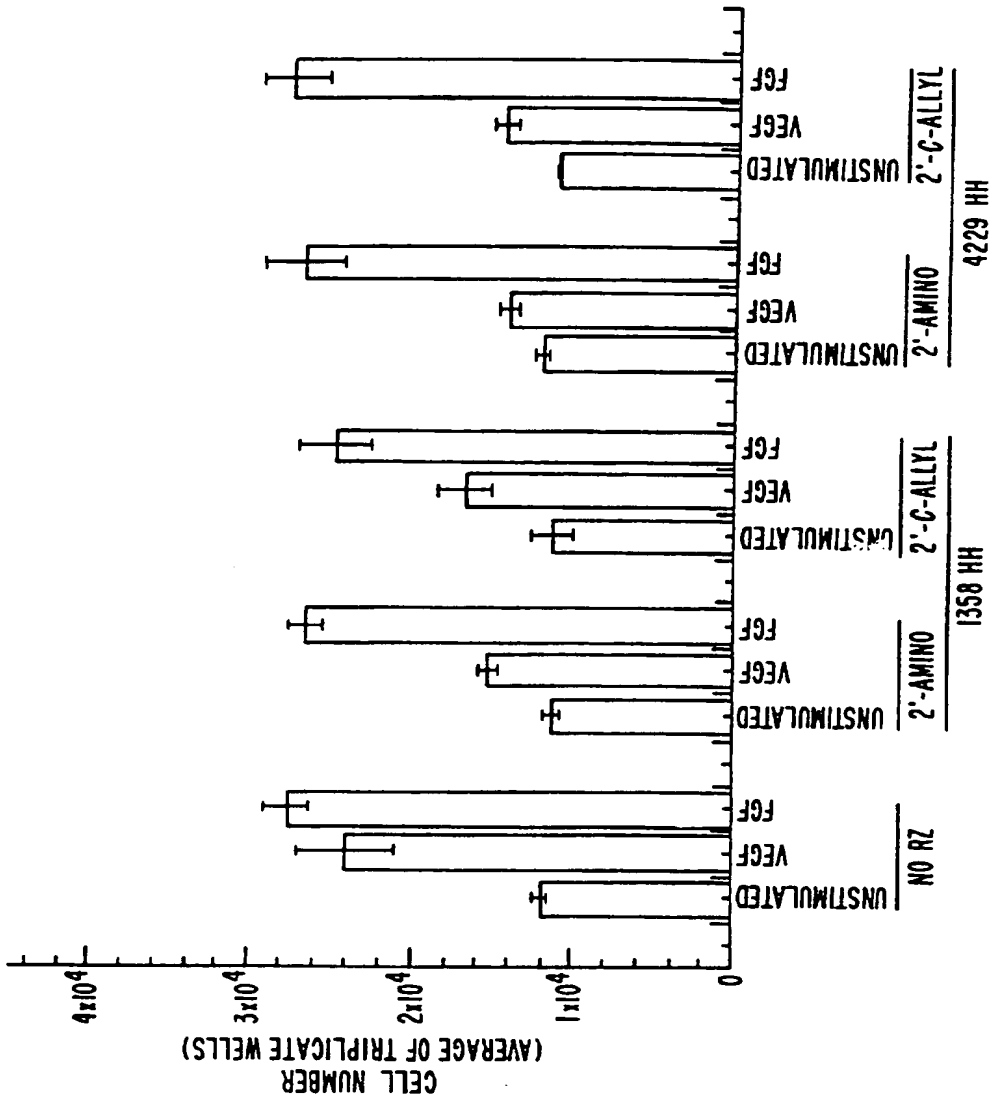

CELL NUMBER
(AVERAGE OF TRIPLICATE WELLS)
0
1x10^4
2x10^4
3x10^4
4x10^4
NO RZ
UNSTIMULATED
VEGF
FGF
1358 HH
2'-AMINO
UNSTIMULATED
VEGF
FGF
2'-C-ALLYL
UNSTIMULATED
VEGF
FGF
4229 HH
2'-AMINO
UNSTIMULATED
VEGF
FGF
2'-C-ALLYL
UNSTIMULATED
VEGF
FGF

FIG. 12B.

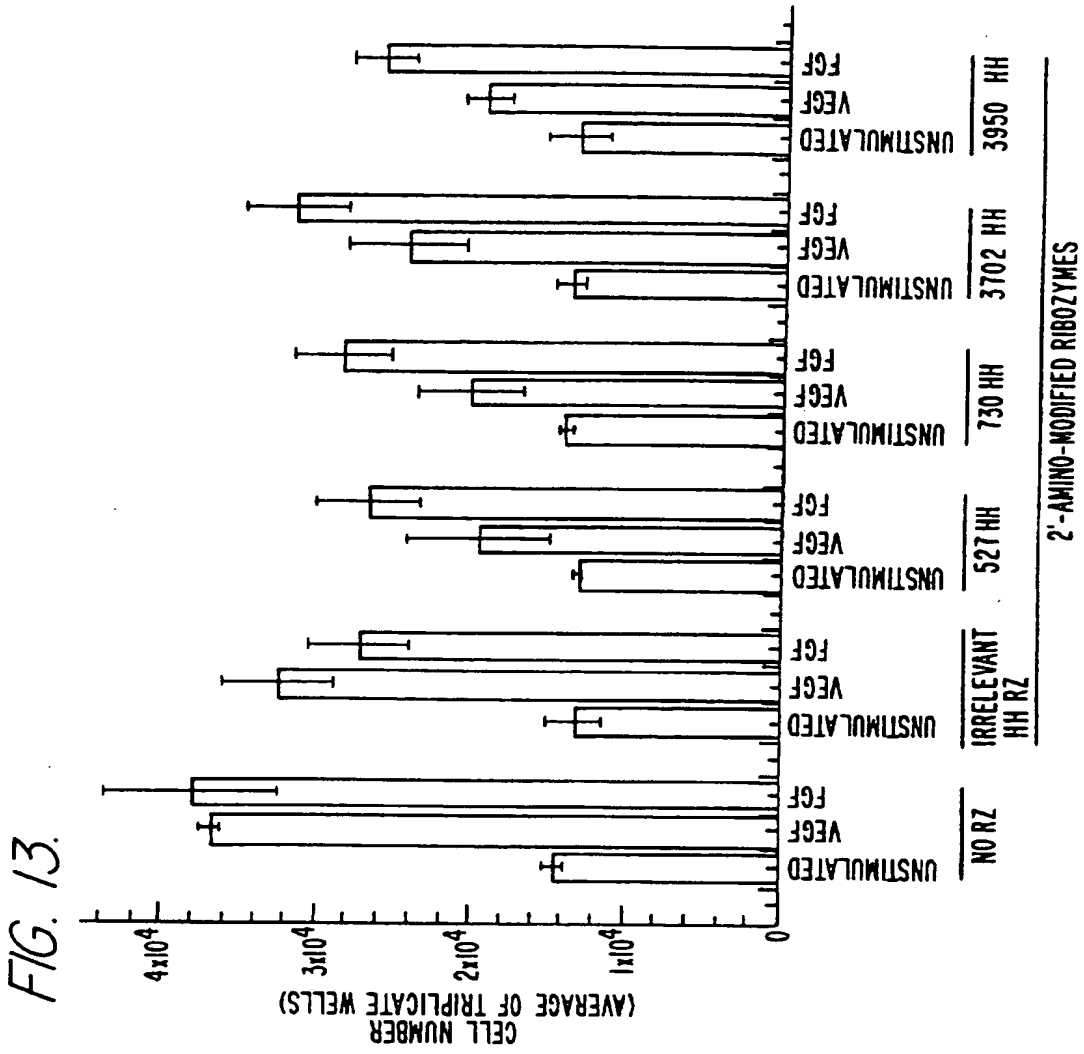

CELL NUMBER
(AVERAGE OF TRIPLICATE WELLS)
0
1x10^4
2x10^4
3x10^4
4x10^4
UNSTIMULATED
VEGF
FGF
NO RZ
IRRELEVANT HH RZ
527 HH
730 HH
3702 HH
3950 HH
2'-AMINO-MODIFIED RIBOZYMES

FIG. 13.

FIG. 14.

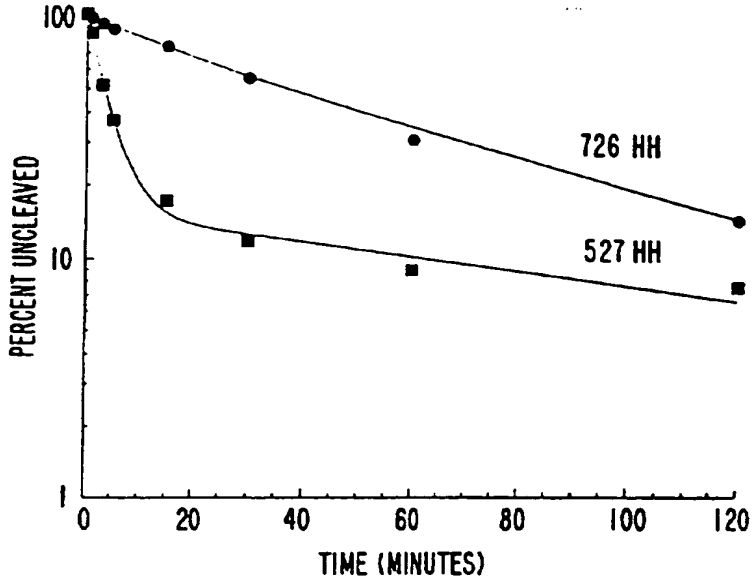

100
10
1
PERCENT UNCLEAVED
726 HH
527 HH
0
20
40
60
80
100
120
TIME (MINUTES)

FIG. 15.

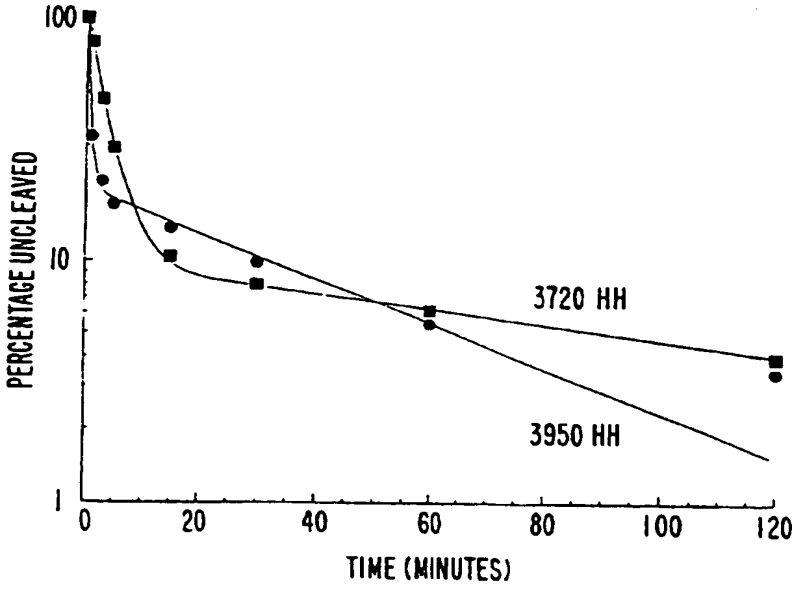

100
10
1
PERCENTAGE UNCLEAVED
3720 HH
3950 HH
0
20
40
60
80
100
120
TIME (MINUTES)

FIG. 16.

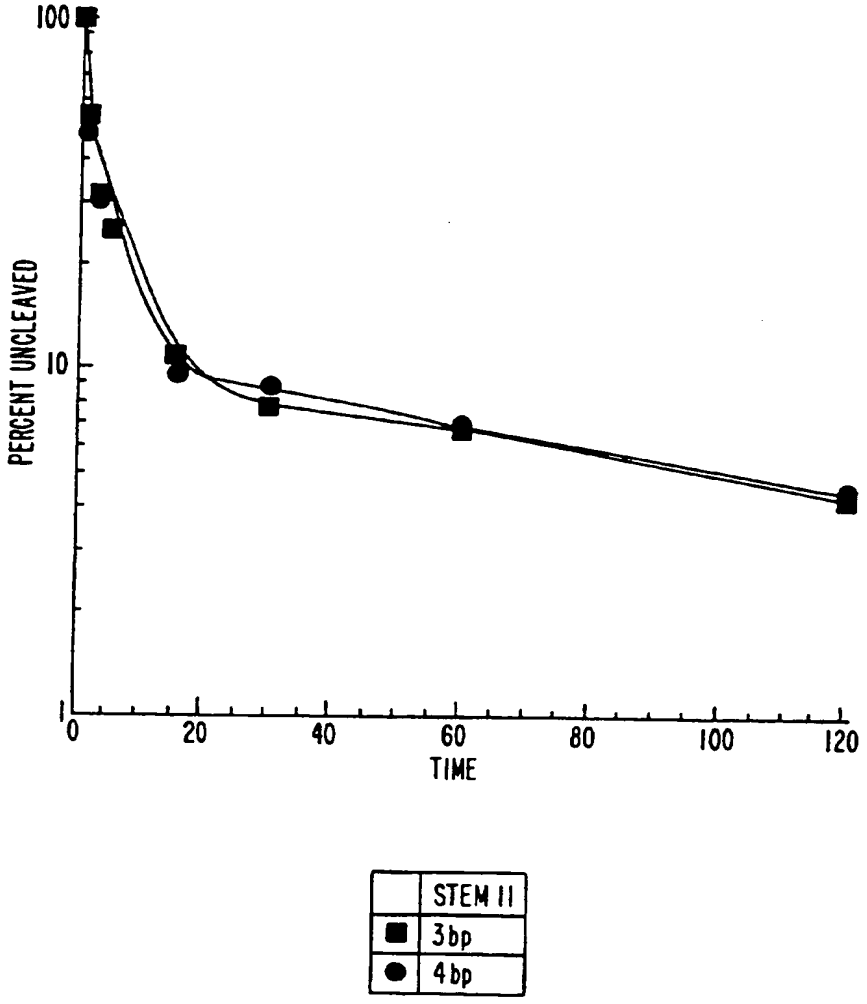
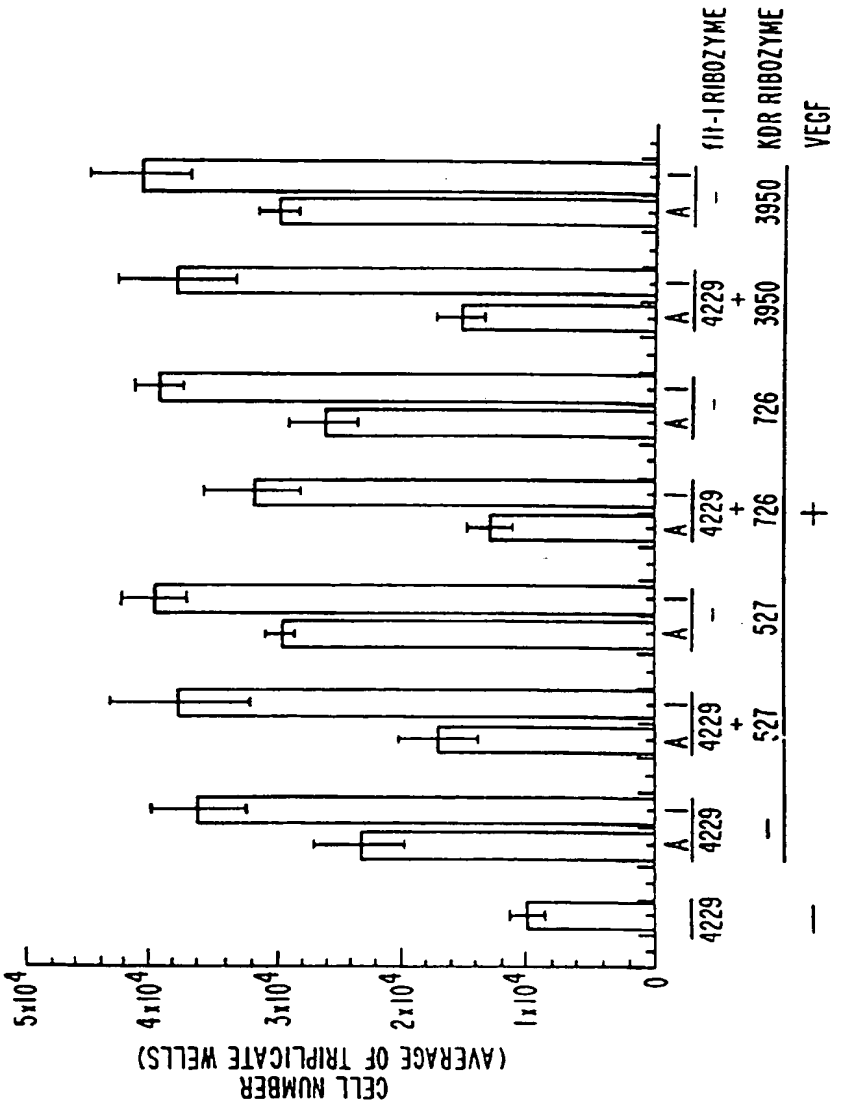

100
10
1
PERCENT UNCLEAVED
0
20
40
60
80
100
120
TIME
STEM II
3bp
4bp

FIG. 17.


CELL NUMBER
(AVERAGE OF TRIPLICATE WELLS)
0
1x10^4
2x10^4
3x10^4
4x10^4
5x10^4
4229
A 1 / 4229
A 1 / 4229 +
A 1 -
A 1 / 4229 +
A 1 -
A 1 / 4229 +
A 1 -
527
527
726
726
3950
3950
flt-1 RIBOZYME
KDR RIBOZYME
VEGF
-
+
-
+
-
+
-
+

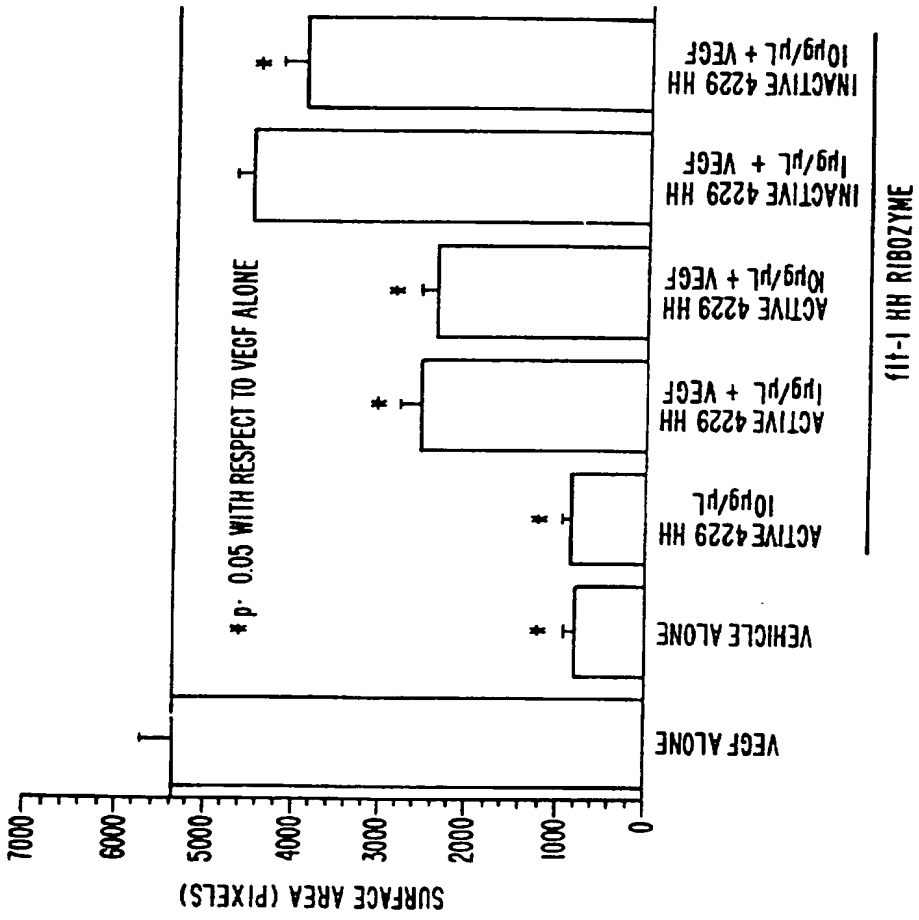

SURFACE AREA (PIXELS)
7000
6000
5000
4000
3000
2000
1000
0
* p< 0.05 WITH RESPECT TO VEGF ALONE
VEGF ALONE
VEHICLE ALONE
ACTIVE 4229 HH 10μg/μL
ACTIVE 4229 HH 1μg/μL + VEGF
ACTIVE 4229 HH 10μg/μL + VEGF
INACTIVE 4229 HH 1μg/μL + VEGF
INACTIVE 4229 HH 10μg/μL + VEGF
I-111 HH RIBOZYME

FIG. 18.